April 1957 Vol. 46 No. 4

# INDUSTRIAL ARTS AND VOCATIONAL EDUCATION

The Shop Teachers' Professional Magazine

A PRE-CONVENTION NUMBER

# The Drawing Instruments Engineers Use and Recommend

Every year thousands of young men reach the point in their schooling where the purchase of a set of drawing instruments is required. When such young men are the sons of technically trained fathers, or when they have the benefit of guidance by any elders in engineering, it is almost certain they will insist on genuine Dietzgen Drawing Instruments. Dietzgen are the drawing instruments engineers use and recommend.

Knowing what to buy and insisting on the genuine is a matter of unusual importance in buying drawing instruments. First, drawing instruments are normally purchased but once in a lifetime. They thus become either a source of pride and satisfaction for many years . . . or a matter of unending annoyance and regret. But of even greater consequence is the fact that fine drawing instruments afford the unique opportunity to inspire men to achievement. The precision and craftsmanship in Dietzgen Drawing Instruments are both a challenge to ambition and an example of the essentials for success in engineering. This inspiration frequently proves to be the foundation for a brilliantly successful career.

Dietzgen Drawing Sets are offered in a wide range of sizes and prices to meet every need . . . featured by the better dealers everywhere.

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Los Angeles · Pittsburgh · Washington · Philadelphia
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### Protect Your Purchase with the Dietzgen Lifetime Service Policy

Many so-called "bargain" sets of drawing instruments are orphans; their manufacturer is either out of business or not responsible for repairs or replacements. Dietzgen Drawing Instruments are protected by a Lifetime Service Policy which is enclosed with each set. This Dietzgen Policy stipulates that the instrument designs are standardized so lost or damaged parts can be replaced with perfectly fitting parts made from the same tools and with the same skill as the original parts. Further, the Dietzgen Lifetime Service Policy stipulates that adequate stocks of such parts will be maintained for the entire lifetime of any purchaser of a set of Dietzgen Drawing Instruments.

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SURVEYING & PRINTMAKING

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The best proof of the superiority of South Bend 13" Lathes is their past record. Shop instructors the country over will tell you of their experiences with these lathes — how quickly students learn to handle them — how they withstand hard usage — their complete suitability for vocational training because they are sturdy industrial lathes. There is no better proof than actual performance under identical conditions — let this be your guide when you select lathes for your shop.

**New MACHINE SHOP PROJECTS Book**

Contains 34 practical projects—graded to match abilities of beginning to advanced students. Each project consists of detailed drawing, bill of material, step-by-step instructions. 104 pages, 8½" x 11", $2.00.

SPECIAL OFFER TO SHOP INSTRUCTORS—Sample copy of project book and companion book "How To Run A Lathe", (value $2.50) sent for only $1.00.

13" x 4' South Bend Engine Lathe (less chip pan and electrical equipment) f.o.b. factory..... $1595

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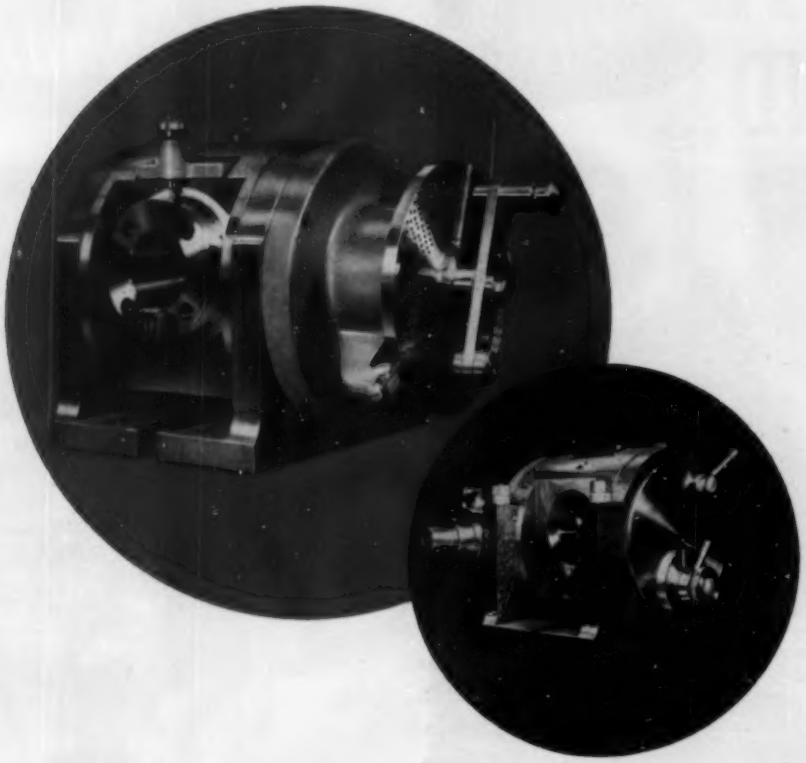

Rear View

# CINCINNATI DIVIDING HEADS

## 10" 12" 14" SWING

One of the most useful accessories for school shop machining instruction is the CINCINNATI Dividing Head. It increases the flexibility of CINCINNATI Knee and Column Milling Machines, and with it students learn to machine such parts as spur, helical and bevel gears, worms, various types of cams, clutches and splines. This accessory is used extensively in industry, and students are sure to encounter it sooner or later. How to operate the Dividing Head, and its possibilities for increasing the use of knee and column milling machines, is a part of student training that should not be overlooked. Would you like to know more about the new CINCINNATI 10", 12" and 14" Dividing Heads? Write for publication No. M-1924.

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*Design Highlights*

- Precision Ball-Bearing Spindle
- No. 50 Series Spindle Taper
- Milling Machine Type Spindle Nose
- Angular Vertical Swivel
- 360° Peripheral Clamping
- Direct Indexing on Spindle Nose
- Completely Enclosed Headstock

CINCINNATI

# CINCINNATI

APRIL
1957

VOL. 46 NO. 4

# Industrial Arts and Vocational Education

## The Shop Teachers' Professional Magazine

Published on the 15th of the month preceding the date of issue by THE BRUCE PUBLISHING CO., 400 North Broadway, Milwaukee 1, Wis. • CENTRAL OFFICE: 20 North Wacker Drive, Chicago 6, Ill. • EASTERN OFFICE: 232 Broadway, New York 7, N. Y.

☆ ☆ ☆

### This Month's Cover

The picture chosen for this month's cover depicts Otto Schulze, left, an instructor in sheet metal work, Bergen County, N. J., Vocational School, assisting a student in fabricating sheet copper into a Built-In-Age time capsule which was officially sealed by Governor Robert B. Meyner in ceremonies at his State House Office, Tuesday, February 5, 1957. The capsule contains items showing New Jerseyites of the year 2057 the ways in which we live today. The time capsule will thereafter be deposited on the site of the new Architects Display Building, Mountainside, N. J. See story on page 123. Eliot Photos, Maywood, N. J.

☆ ☆ ☆

### Easter Seals Help Crippled Children

The 1957 Easter Seal campaign began on March 15 and will continue through April 21.

Send your contributions to your local Easter Seal Society or to National Society for Crippled Children and Adults, Inc., 11 South LaSalle Street, Chicago 3, Ill.

☆ ☆ ☆

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*Discontinuance.*—Notice of discontinuance of subscription must reach the Publication Office in Milwaukee, at least fifteen days before date of expiration. Notices of changes of address should invariably include the old as well as the new address. Complaints of non-receipt of subscribers' copies cannot be honored unless made within fifteen days after date of issue.

*Editorial Contributions.*—The Editor invites contributions bearing upon Industrial Arts, Vocational Education, and related subjects. Manuscripts, drawings, projects, news, etc., should be sent to the Publication Office in Milwaukee. Contributions are paid for upon publication. In all cases manuscripts should be accompanied by full return postage.

*Articles Indexed.*—The articles contained in the Magazine are regularly indexed in "The Readers' Guide to Periodical Literature," and "Education Index."

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# Association News

## THE 1957 MEETING OF THE AMERICAN INDUSTRIAL ARTS ASSOCIATION

When the American Industrial Arts Association meets at Kansas City, Mo., for its nineteenth annual convention, April 24–26, it will be marking a high point in membership, professional growth and convention attendance.

According to AIAA president Roy A. Radtke, Director of Industrial Arts in Milwaukee public schools, the association will open its Kansas City sessions as a strong voice for industrial arts education backed by more than 5500 active members in the United States and Canada. Its convention theme, "Developments Affecting Industrial Arts Education Programs" will emphasize the increasingly important role of the industrial arts education in the public school system.

Dr. Lindley J. Stiles, dean of the University of Wisconsin School of Education, who is scheduled to keynote the convention at the first general session Wednesday afternoon, will outline the developments which are affecting education today in America. Dr. John A. Fuzak, co-ordinator of industrial arts at Michigan State College, will analyze these developments to determine their implications for industrial arts programs in public schools.

Delegates will then take up problems created by the increasing clamor for more technicians in industry, rapidly increasing school enrollment, and technological developments in modern industry.

Other special questions to be discussed will include specific developments in industrial arts at the college level, working industrial arts into the total school curriculum, standards, codes of practice and ethics in industrial arts that remain true in spite of social and economic changes in American culture.

Thursday, April 25, a panel will explore the implications of automation and the effect such technological advances will have on industrial-arts curricula. Other general sessions will discuss the world situation and its influence on education; learning and behavior problems.

Whether or not industrial-arts departments ought to undertake a program of driver education will be the subject of a debate in a Friday meeting.

The eighth annual convention of the American Council on Industrial Arts Teacher Education and the seventh annual convention of the American Council of Industrial Arts Supervisors, both affiliates of AIAA, will be held concurrently. Sessions will begin Tuesday, April 23, and continue into Wednesday. ACIATE delegates will discuss the future of industrial-arts education, changing role of industrial-arts teacher education and improvement in and through industrial-arts teacher education. A program for ACIAS will be supplied to its members before the convention.

Members of the American Council of Industrial Arts Association Officers convening for the third year will report on the activities of state Industrial Arts associations.

The convention program for Friday, April 26, includes demonstrations by college students from several midwestern states, in metalwork, electricity, graphic arts, metal tooling, drafting, plastics, photographic silk screen, and electronic devices. Kansas City and suburban junior and senior high school student-made projects will be on exhibit in the auditorium arena.

Two scheduled tours of schools and industry are planned for Wednesday, April 24, from 10:30 a.m. to 1:00 p.m. Prepared lists of schools and industries of interest to convention goers will be available.

The Ship's Program will begin Friday at 8:30 p.m., after a buffet supper. Hospitality for wives of conventioneers will be provided daily at the hotel. Hospitality rooms will be open from 10 a.m. to 12 noon, and from 2 p.m. to 4 p.m. Also in store for the ladies is a tour of the Hallmark Card Company, and another to points of interest in Kansas City; a card party, and a luncheon and fashion show at Macy's department store.

Tuesday sessions will be held at the Hotel Muehlebach. All other programs are scheduled for the Kansas City Municipal auditorium.

## COMING CONVENTIONS

*Mar. 23. Nebraska Industrial Education Association*, at Grand Island, Neb. Secretary-treasurer, Myrton L. Hall, Monroe Jr. High School, 52nd & Bedford Ave., Omaha, Neb.

*Mar. 28. Alabama Vocational Association*, at Phillips High School, Birmingham, Ala. Secretary, H. R. Culver, 105 Thach Hall, Auburn, Ala.

*Apr. 4–6. Illinois Vocational Association*, at Sherman Hotel, Chicago, Ill. Secretary,

(Continued on page 6A)


SHELDON

*Builder of Sheldon Lathes, Milling Machines, Shapers and Sebastian Lathes*

**It only takes one good Milling Machine and a capable Shaper to triple the value of your shop course**

No course in shop practice can be complete without basic instruction on the milling machine and the shaper.

For this no other units equal the size "0" Sheldon Milling Machine with its hand and power table feed, quick-change gear box, variable speed drive, back geared unit, and interchangeable vertical milling head attachment. No other shaper is better suited for class work than the ample size Sheldon 12" Back Geared Shaper with its large capacity, long stroke, variable speed drive, weight and accuracy.

These are standard machine tools with which you can teach modern methods and tool performance—— full powered industrial tools that can give your students the "feel" experience and satisfaction of adult work.

Sheldon provides today's modern school shop with "up-to-date" machine tools . . . with 10", 11", and 13" Precision lathes for both industrial arts and vocational programs . . . Sheldon Milling Machines . . . Sheldon Shapers . . . and, for advanced courses, Sebastian 13" and 15" Geared Head Lathes.

**BASIC TEACHING AIDS**

In addition to providing conveniently located distributors with experienced sales engineers, Sheldon prepares and publishes basic teaching aids, for shop instructors.

Write for samples today——

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**4244 N. Knox Ave., Chicago 41, Ill.**

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No. 16 NIBBLER

NEW Black & Decker
No. 16 SHEAR

# Two New B&D Tools improve sheet metal training!

## Faster, lighter, easier handling, POWER-BUILT and packed with features

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By actual test, they're faster and longer-lived than competitive tools. Their lighter weight means easier handling. Their centrifugal fans give cooler running. Each has exclusive construction features to stand up under the shock of sheet metal cutting.

Call your nearby Black & Decker distributor for a free demonstration. For full details on new features, write to: THE BLACK & DECKER MFG. CO., Dept. 4504, Towson 4, Maryland. (In Canada: 80-86 Fleet Street, E., Toronto 2, Ontario.)

Look Under "TOOLS-ELECTRIC" in Yellow Pages

**Leading Distributors Everywhere Sell**

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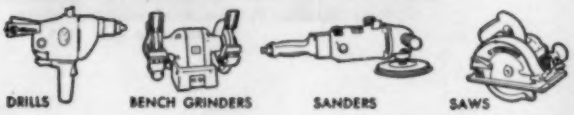
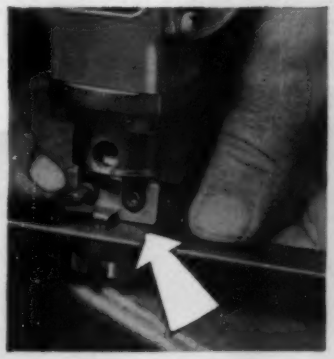
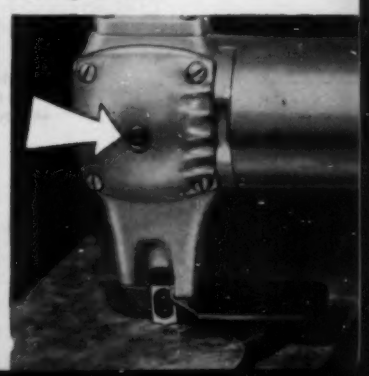
**Portable Electric Tools—Power-Built to set the pace**



UP TO 3 TIMES FASTER than competition, new B&D Nibbler has twice the life, 20-30% less weight, reversible punch. Adjustable stripper plate (left), smaller diameter (right) are extra features.

50% FASTER than competition, new B&D Shear has one-third less weight than closest competitor, lasts much longer. Deflector plate prevents curling of material. Adjusting screw allows quick positioning of blade.



## ASSOCIATION NEWS

(Continued from page 4A)

Orlin D. Trapp, Waukegan Township High School, Waukegan, Ill.

*Apr. 5–6. California Industrial Education Association,* at Civic Auditorium, San Jose, Calif. Secretary, Lee D. Bodkin, 131 Education Building, University of California, Los Angeles, Calif.

*Apr. 5–6. Colorado Industrial Arts Association,* at Colorado Springs, Colo. Secretary, Harold L. Baldwin, 2618 Dahlia Lane, Pueblo, Colo.

*Apr. 11–13. Michigan Industrial Arts Association,* at Pantlind Hotel, Grand Rapids, Mich. Secretary, Eugene B. Watkins, 4029 Allen St., Bay City, Mich.

*Apr. 11–13. Michigan Industrial Education Society,* at Civic Auditorium, Grand Rapids, Mich. Secretary, Eugene Watkins, 4029 Allen St., Bay City, Mich.

*Apr. 12. Industrial Education Conference,* at Iowa State College, Ames, Iowa. Secretary, Lowell L. Carver, 101 Industrial Arts Building, Iowa State College, Ames, Iowa.

*Apr. 12. Tennessee Vocational Association,* at Nashville, Tenn. Secretary, W. A. Seeley, 11 East Cordell Hull Building, Nashville, Tenn.

*Apr. 12–13. Connecticut Industrial Arts Association,* at Teachers College of Connecticut, New Britain, Conn. Secretary, Carl H. Hubachek, 21 Sunset Road, East Haven, Conn.

*Apr. 12–13. Missouri Industrial Education Association,* at University of Missouri, Columbia, Mo. Secretary, M. L. Stewart, State Director of Education, Jefferson City, Mo.

*Apr. 19–20. Washington Industrial Arts Association,* at Senior High School, Kennewick, Wash. Secretary, Wallace Bennth, 819 West 19th St., Kennewick, Wash.

*Apr. 20. Utah Industrial Arts Association,* at Glendale Junior High School, Salt Lake City, Utah. Secretary, Leland V. Bangerter, South Junior High School, 4300 Madison, Ogden, Utah.

*Apr. 23–26. American Industrial Arts Association,* at Hotel Muehlenbach and Municipal Auditorium, Kansas City, Mo. Secretary, Kenneth W. Brown, Box 2350, Buffalo 23, N. Y.

*Apr. 27. Virginia Council of Industrial Education Clubs,* at George Washington High School, Alexandria, Va. Secretary, Albert R. Connors, Newport News High School, Newport News, Va.

*May 1–2. New York State Steering Committee for Industrial Arts,* at Powers Hotel, Rochester, N. Y. Secretary, Robert Ullery, 42 Blauvelt Road, Blauvelt, N. Y.

*May 2–4. New York State Vocational and Practical Arts Association,* at Powers Hotel, Rochester, N. Y. Secretary, Reno Knouse, Teachers College, Albany, N. Y.

*May 9–10. Oswego Industrial Arts Spring Conference,* at New York Teachers College, Oswego, N. Y. President, Arthur Hauler, Teachers College, Oswego, N. Y.

**GIVES SCHOOL SHOPS**

**ACCURACY, CAPACITY AND POWER**

This 12" swing lathe typifies Logan advanced design and rugged construction. Gears are extra wide and strong. Shafts are extra heavy. The lead screw has a full ⅞" diameter. The precision carriage rides on a two-V-way, two-flat-way bed that is rugged, precision ground and warp-free. The heavy spindle turns on oversize ball bearings, no bearing adjustment needed for any speed between 38 and 1575 rpm. This lathe, and every Logan Lathe from 14" swing down to 9" swing, is dynamically balanced before it is shipped. The result is *sustained accuracy* and smooth, quiet power on every lathe turning operation. See your Logan Lathe dealer for more facts—or mail us the coupon below.

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Variable Speed Drive
35" Centers

**THIS COUPON**
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Send me full facts on the Logan line.

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School.....

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City.....Zone....State.....


## CALIFORNIA INDUSTRIAL EDUCATION ASSOCIATION CONVENTION

The California Industrial Education Teachers will hold their annual convention in the Civic Auditorium in San Jose, Calif., on April 5 and 6. This annual convention will be preceded by the Industrial Education Conference made up of supervisors, administrators, and teacher trainers under the leadership of Samuel L. Fick, chief of the Bureau of Industrial Education, State Department of Education in California.

About 1200 participants are expected at the convention, and over 75 commercial exhibitors will display their equipment and supplies.

The meeting will close on Saturday night, April 6, with a banquet at the Hawaiian Gardens in San Jose.

Lou Mitchell, Director of Educational Relations, General Motors Corporation, Detroit, will address the convention on the topic, "Looking Ahead in Industry."

Fred Plonsky, deck officer for the Ship, will present the annual Ship's Citation and supervise the awarding of the Ship's plunder.

## SCIENCE TEACHERS' MEETING HELD

Dr. George G. Mallinson, dean of the School of Graduate Studies at Western Michigan College, announced that the Michigan Science Teachers Association held its third annual convention on Saturday, March 2, at the Lansing Eastern High School.

The principal subject for discussion on this date was the training of teachers in science at the pre-service, in-service, and graduate levels.

During the past two years the association has undertaken extensive studies on the status of Michigan science teachers, and the subject matter now being taught.

The association includes both high school and college teachers.

Both Dr. Mallinson and Dr. W. C. Van Deventer, head of the Western Michigan College biology department, are former presidents of the National Association for Research in Science Teaching.

## EIGHTEEN INITIATED INTO EPT

Eighteen candidates for membership in Epsilon Pi Tau were initiated by the Alpha

(Continued on page 10A)

# STANLEY SHOP TALK

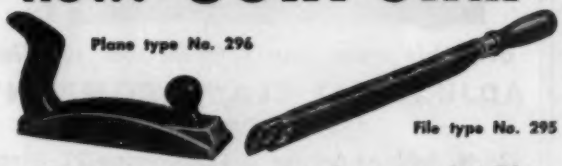
## CATALOG No. 34

This STANLEY TOOL CATALOG with the special school index is a particularly useful book of reference and tool information for the shop teacher.

Packed with descriptive facts and hundreds of illustrations, it makes tool selection sure and easy. The handy school index recommends items found most useful and serviceable for school use. It is based upon Stanley's long experience and the advice of educators.

Use the coupon to send for your free copy of the STANLEY TOOL CATALOG with special school index. We will include a 9-page list entitled, *"Suggested Specifications for Equipping a General Shop."*

## new! "SURFORM"®



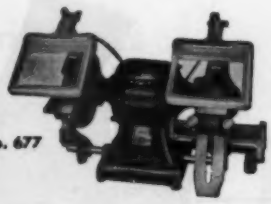

This is the amazing new tool everyone is talking about. 450 cutting edges cut wood, fibre boards, plastics, soft metals, etc. Fast, easy to use . . . both tools have same replaceable blade. Sure to be popular and useful in your school shop.

## Screw-Mate®

**Stanley No. 1525 Drill-Countersink**

This new Screw-Mate does 4 jobs at once — drills pilot hole and shank clearance, countersinks, and always stops at exactly the right screw depth. Fits chuck of hand drill, power drill or drill press. 24 sizes — from ½" x No. 5 through 2½" x No. 12. ¼" shank. Screw-Mate counterbores and plug cutters also available.

## BENCH GRINDER




Especially designed for the school shop. The grinding attachment is for all chisels and plane irons up to 2⅝" wide. Equipped with "Flud-Lite" Eye Shields that cannot be moved to non-guarding position.

## CATALOG NO. 57E

Get this up-to-date STANLEY ELECTRIC TOOL CATALOG now — it includes new belt and orbital sanders. You will find it full of useful facts for the shop teacher. Be sure to order this catalog with the STANLEY TOOL CATALOG described above. Check both items on the coupon.

**Use this coupon for more detailed information and school shop help**

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# Cut Clean, Punch True with These New, Extra Tough...

*Snap-on* set No. PC-170-K contains five starter punches and five drift punches 3/32 to 5/16 in.; five chisels 13/32 to 7/8 in.; and two center punches.

## Snap-on* CHISELS and PUNCHES

This new *Snap-on* Chisel and Punch set contains the basic tools to handle a wide range of jobs. A mechanic can select the *right* chisel, starter punch or drift punch to get cleaner, more exact results, longer tool life.

**Here is why experienced mechanics prefer *Snap-on*:**

**Special Steels scientifically heat-treated for long life.** High silica, manganese, molybdenum steel is heat-treated under controlled atmosphere for uniform hardness. Chisel and punch heads are then induction-drawn to reduce hardness to just the right degree. The result is a slow mushrooming, long-life striking surface.

**70-Degree chisel edge cuts better, stays sharp longer.** Exhaustive tests by *Snap-on* engineers show that by shaping blade to a 70-degree angle, the chisel cuts better, stays sharp longer.

**New Eight-Face surface for firm, comfortable grip.** *Snap-on* chisels and punches have eight sides to give user a better, more comfortable surface for firm control, safer grip. Also, tool does not roll when placed on bench.

**New Style hold-tight kit bag.** New kit bag folds easily — has a transparent flap which keeps tools from dropping out.

Write for new, large training chart describing various types of chisels and punches.

*Snap-on is the trademark of Snap-on Tools Corporation.

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REG U S PAT OFF
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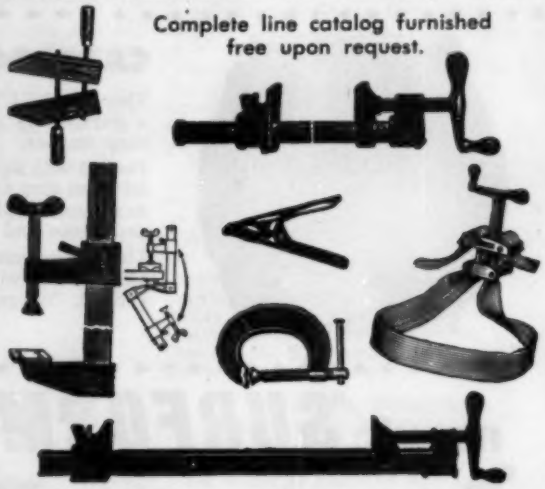
**favorites in the SCHOOL SHOP for nearly 60 years**

Complete line catalog furnished free upon request.



***available from your favorite tool supplier***

**ADJUSTABLE CLAMP COMPANY**
*"the clamp folks"*
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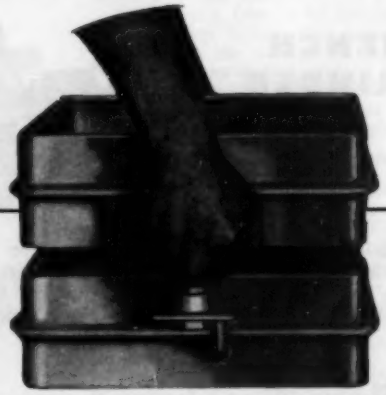
# USE STERLING STEEL FLASKS FOR *Easy Handling!*



Sterling Style "E" Flask

You'll find Sterling Style "E" Flasks exceptionally easy to handle because pin lugs are combined with handles. In many foundries, these Style "E" Flasks have replaced snap flasks. They prevent runt outs . . . require less sand. Sterling Steel Flasks combine maximum strength with minimum weight. They retain their rigidity and accuracy, year-in, year-out. Write for Sterling Catalog.

**STERLING WHEELBARROW CO.** Milwaukee 14, Wis., U.S.A.

# You need *RUGGED* machine tools . . . *CLAUSING* has them!

***. . . and they set the standards for safety.***

Take the CLAUSING 6300 LATHE for example—it's ruggedly built with wider, deeper beds, and flame hardened bed ways standard equipment . . . forged steel spindle . . . "Zero Precision" Timken tapered roller bearings . . . oil bath lubrication in headstock, quick-change box and apron. Most rugged in their class.

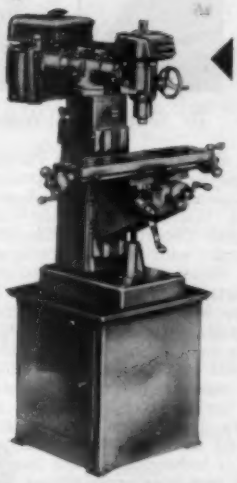
And they have these important safety features: tapered key drive spindle nose . . . completely enclosed underneath drive . . . "safety" apron and quick-change control features . . . completely enclosed headstock, apron, quick-change box.

Be sure to investigate Clausing and *compare* before investing in *any* lathe.

**CLAUSING 12" LATHE PRICES BEGIN AT $655, F.O.B. FACTORY**

***Safety Sam Says:***
Write for free Safety Sam posters, and catalogs.

**SCHOOL SHOP PLANNING GUIDE - 50¢**
(65c outside U.S.A.)



**VERTICAL MILLER**
Mills, drills, bores, reams and shapes—at all angles — with one setup! 6" x 24" table, 7 ball bearings in drive, 3" quill travel, six spindle speeds — 180 to 3250 R.P.M. Standard in industry, *essential for training!*

**18" DRILL PRESS**
A heavy-duty drill with many exclusive features for long-service life. Drills to center of 18¼" circle. Capacity, ¾" in steel, 1" in cast iron — 6½" spindle travel.

**CLAUSING** **DIVISION, ATLAS PRESS COMPANY**
4-121 N. Pitcher St. • Kalamazoo, Michigan

*Teaching is Easier—*

*with LOW COST—*
*HIGH QUALITY—*

**SIMONDS**
**SI-CLONE**
**SAWS**

Your students will learn faster with quality equipment that costs no more — equipment that fits into purchase budgets and costs less to maintain.

Simonds Si-Clone Saws are made of highest grade, electric furnace alloy steel. They give you and your students smoother, straighter cuts that need less finishing, save time, assure better work. They give longer service between resharpenings too, because they hold their edges longer!

13 different blade types up to 12" diameter, including Dado Heads and Carbide-Tipped, are made to fit all standard table, radial arm or portable electric hand saw machines. See your Hardware or Mill Supply Dealer today for them — and for Simonds "Red Tang" Files, "Red End" Hack Saw Blades and wood and metal cutting band saw blades.

**RIP, CUT-OFF AND COMBINATION SAWS**

| | | | |
|---|---|---|---|
| 6" | $2.01 | 9" | $3.05 |
| 7" | 2.30 | 10" | 3.62 |
| 8" | 2.47 | 12" | 5.00 |

*Supplied with round or special shape hole*

**Guarantee:** Made of SIMONDS STEEL fully guaranteed against any defect in material or workmanship.

**SIMONDS SAW AND STEEL CO.**

FITCHBURG, MASS.

*Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon. Canadian Factory in Montreal Que.*

*125 years of growth 1832-1957*


## ASSOCIATION NEWS

(Continued from page 6A)

Psi Chapter at Los Angeles State College of Applied Arts and Sciences on Saturday evening, January 12, 1957.

J. Lyman Goldsmith, supervisor of industrial arts and vocational education and agriculture of the Los Angeles City Schools, addressed the dinner group on the subject "The H-R Factor."

The newly initiated members honored at this dinner were Donald L. Binder, Norman B. Lardner, Leon Leyson, Howard E. Mall, Richard L. Melton, Alfred V. Merlo, Emil A. Miller, Charles E. Moody, Gerald M. Mugerian, Bela B. Palagyi, Frederick W. Purdy, George A. Richards, Adolphus Rogers, Keith G. Rogers, Morris J. Saul, James B. Sharp, Leonard G. Sterle, and Richard R. Swift.

## *Personal News*

### DR. GORDON O. WILBER TO RETIRE

Dr. Gordon O. Wilber, director, Division of Industrial Arts at the State University of New York Teachers College, Oswego, N. Y., will retire from his position in June, 1957.

His retirement will be an active one as Dr. Wilber is to assume a position as leader of a four-man team who are charged with the responsibility of developing an industrial-arts teacher education program for the Philippine Islands and southeast Asia. This program,

Dr. Gordon O. Wilber

which will take him to the Philippine Islands for two years, is jointly sponsored by the International Cooperation Agency of the United States State Department and the Philippine Department of Education, through a contract with Stanford University.

Dr. Wilber leaves a long service in industrial arts education at Oswego. He came to Oswego in 1933 as an instructor of metal shop and held this position until 1940 when he was made acting director of industrial arts. One year later he became director.

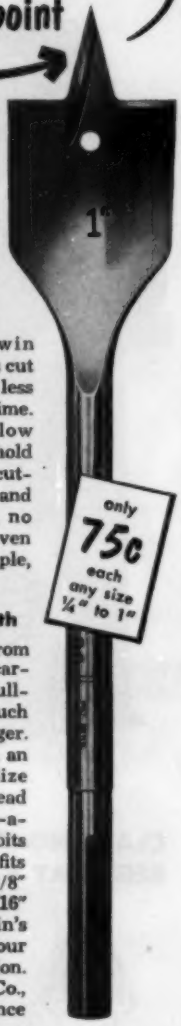
He received his undergraduate degree at New York University and his master's and doctor's degree from Ohio State. Dr. Wilber has held many positions of leadership in the fields of industrial arts and has been a member of numerous organizations: for two years he was president of the American Industrial Arts Association; chairman, Board of Trustees of Epsilon Pi Tau since 1946; and a member

(Continued on page 20A)


**NEW IRWIN BIT***

**SPEEDBOR "88"**

**Exclusive hollow ground point**




**steps-up efficiency of small ¼" electric drills**

School Shops using small ¼" electric drills and drill presses can now speed-up class work, increase the boring range of present equipment. New Irwin Speedbor "88" wood bits cut cleaner and deeper with less power and in less time. Irwin's exclusive hollow ground point takes hold faster, new spade-type cutters keep holes clean and accurate. No binding, no clogging, no wobble—even in seasoned hardrock maple, plywood, or plastics.

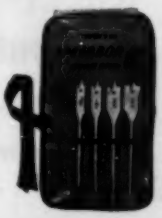
**Hardened Full Length**

Forged in one piece from solid bar of special high carbon steel and hardened full-length to stay sharp much longer, last much longer. Easily resharpened with an ordinary hand file. Size markings shown on head for easy selection. Hang-a-Bit hole lets you store bits on nail or pin. Shank fits perfectly in 1/4", 5/16", 3/8" and /2' chucks. Sizes 4/16" to 16/16". Include Irwin's new Speedbor "88" on your next purchase requisition. The Irwin Auger Bit Co., at Wilmington, Ohio, since 1885.

*Patented

**SPEEDBOR "88" Sets**

Available in colorful red plastic roll kits. Individual pocket for each bit. Sets of 4, 6 or 11 bits store easily in tool chest or on shelf or work bench. As low as $3.00.

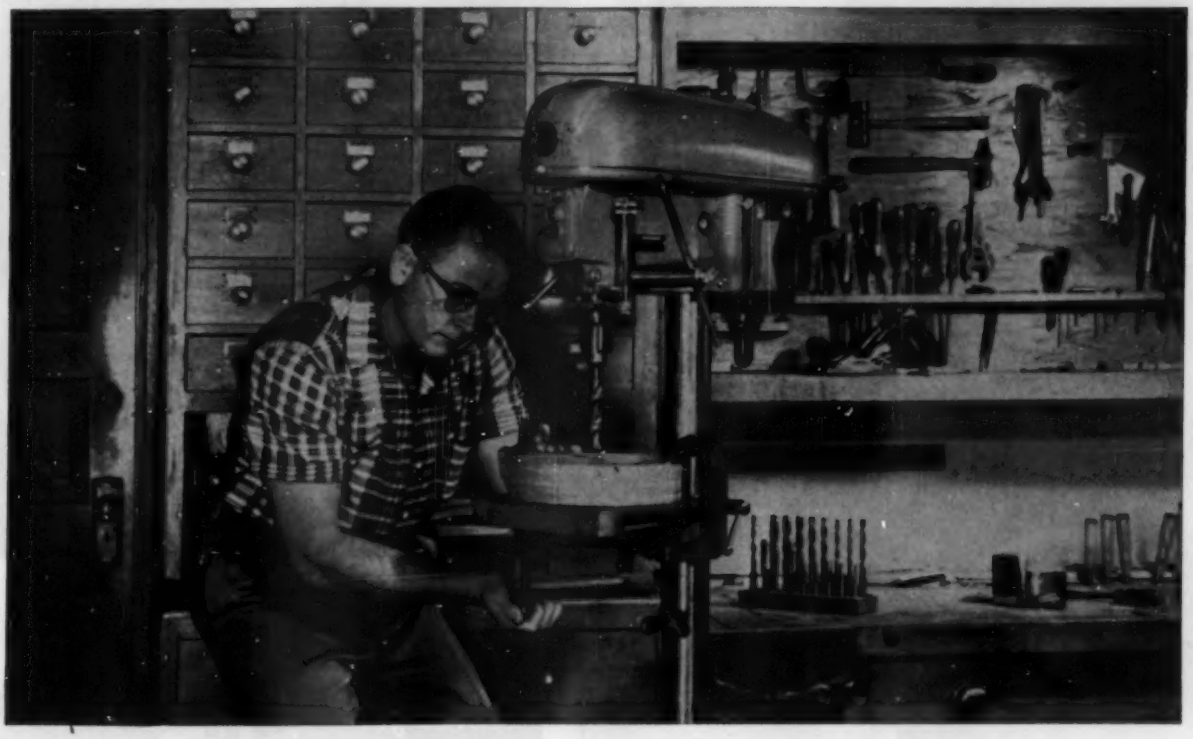


**Free Catalog No. 52.** Used by many School Shop Instructors as a handy reference and ordering guide. Shows auger bit types, sizes and recommended uses. Write Irwin, Dept. 7B, Wilmington, Ohio.

**IRWIN** the original solid center auger bit • screw drivers screw driver bits

ROCKWELL-BUILT

# NEW DELTA 14" utility drill press



## ...genuine industrial quality at lowest cost

**No other drill press in its class offers so many outstanding features, so many industrial quality extras—at anywhere near the price! It's big—rugged—safe—ideal for student instruction and here's why:**

**SAFE, EASY OPERATION**—Swing-type belt guard for fast, easy speed changes—work table with clamping ledges and T-slots facilitates work—optional push button switch for maximum safety—plus many other Delta Quality features permit students to learn quickly, safely, with minimum instruction.

**UNMATCHED VERSATILITY**—Six interchangeable spindles make it easy to adapt for routing, shaping, mortising, grinding, reaming—plus countless other jobs. Enables you to teach many operations normally requiring expensive single-purpose machines.

**PRODUCTION-LINE RUGGEDNESS**—This is the same 14" drill press being used today in thousands of industrial plants—built for years of accurate, dependable operation with little or no expensive, time-consuming maintenance!

**GET ALL THE FACTS**—Compare with any other drill press in its class—see why it's your *biggest* drill press value! Your Delta Dealer is listed under "TOOLS" in the Yellow Pages of your phone book.

***Send coupon for all the facts!***

DELTA ROCKWELL

another product by **ROCKWELL**

DELTA ... Pride of The Nation's Schools

**Delta Power Tool Division, Rockwell Manufacturing Co.**
**402D N. Lexington Ave., Pittsburgh 8, Pa.**

☐ Please send complete information on new Delta 14" Utility Drill Press.

☐ Please send names of my nearest Delta Dealers.

Name_____ Title_____

School_____

Address_____

City_____ County_____ State_____

# PARKS PLANERS Give Your Students Practical Experience on Popular Industrial Machines

Students learning on Parks Planers benefit not only from the safe, easy, and accurate operation of these planers, but also from the practical experience of working on the same type of high-speed, precision built planers they will eventually use in their trade. The Parks No. 20, 20" Planer (at right) has a 4-knife cutter-head with a speed of 3600 R. P. M. and offers two feed speeds—20 and 40 F. P. M. or 40 and 80 F. P. M. Available with knife-grinding attachment at additional cost.

THE **PARKS** No. 20
20" Thickness PLANER
WITH KNIFE-GRINDING ATTACHMENT

THE **PARKS** HEAVY-DUTY
12" Thickness PLANER

At left is the Parks Heavy-Duty 12" x 4" Planer—a compact, sturdy thickness planer with feed speed of 16 F. P. M. at 4000 R. P. M. Will handle material as short as 6" and as thin as ¼". Both planers are priced low enough for even the most modest shop budget. WRITE FOR COMPLETE DESCRIPTIVE LITERATURE.

THE **PARKS** WOODWORKING MACHINE CO., Dept. 22 1546 Knowlton St., Cincinnati, Ohio
MANUFACTURERS OF QUALITY WOODWORKING MACHINES SINCE 1887

# OLIVER DISK & BELT SANDER

*A sturdy, low-cost Sander . . . ideal for school shops*

This accurate, handy Sander is most helpful in school shops. Has 15-inch disk with table that tilts 45° down, 25° up. Two gauges enable you to sand angular and circular work smoothly and without fuss. Write for Bulletin No. 182-D.

A 6-inch belt sanding attachment on opposite side of motor can be operated in a vertical or horizontal position. Especially effective on straightline work. Write for Bulletin No. 182-DB.

OLIVER MACHINERY COMPANY
*Since 1890* GRAND RAPIDS 4, MICH.

# ARMSTRONG
GENERAL CATALOG NO. 57

**Listing approximately 5,000 quality tools for industry, including:**

- ★ Tool Holders (The complete Armstrong System)
- ★ Cutting Tools (Tool Bits, Cut-off Blades, Carbide Cutters and Inserts)
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- ★ Machine Shop Specialties
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- ★ Drop Forged Eye Bolts and Hoist Hooks
- ★ Drop Forged Machine and Crank Handles
- ★ Drop Forged Wrenches
- ★ Detachable Sockets and Drive Parts
- ★ Bridge Ratchets and Sockets
- ★ Adjustable Wrenches
- ★ Torque Wrenches
- ★ Pipe Tools
- ★ Chain Tongs

No industry reference file is complete without the new Armstrong No. 57 Tool Catalog.

Buy ARMSTRONG TOOLS from your Industrial Distributor

ARMSTRONG BROS. TOOL CO.
5222 W. ARMSTRONG AVE. • CHICAGO 30, ILL.

**Vertical Lumber and Metal Storage Rack.** Holds 12 to 14 ft. lengths of lumber, pipe, bar stock or conduit in the vertical compartments. Three shelves are provided for shorts. Base shelf is 24 in. deep, intermediate shelf 18 in., and top shelf 12 in. Triangular unit is 4 ft. wide, 34 in. deep at base. Rectangular plywood storage unit is 24 in. deep, holds sheets on 4 ft. edge.

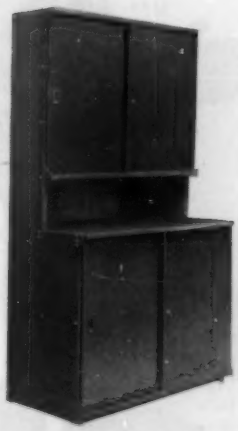
**Tool Storage Cabinets.** Wall and floor types, with all-steel pegboards. Wall type has pegboard area of approximately 24 sq. ft., floor type approximately 65 sq. ft.

**Apron and Book Racks.** Provides space for aprons, books, etc., of 12 students. Each compartment is 12 in. deep, 12 in. wide, 9 in. high.

# All the storage units you need in HALLOWELL School Shop Furniture

Need racks for storing current supplies of lumber, pipe, bar stock, conduit? Or steel pegboard cabinets for safely storing tools? Or cabinets for holding student projects? Or wardrobe cabinets for apparel? We make standard units of HALLOWELL School Shop Furniture for all these storage requirements. And they cost much less than custom-designed equipment.

Write for Bulletin 2246 today. It gives detailed information about the complete line of functional HALLOWELL units for outfitting industrial arts and vocational shops. Hallowell Shop Equipment Division, STANDARD PRESSED STEEL CO., Jenkintown 74, Pa.



**Stain and Finish Cabinets.** All-steel for safe storage of flammable materials. The base has one adjustable shelf, the upper cabinet two. Both base and upper cabinet are equipped with smooth-operating sliding doors.

STANDARD PRESSED STEEL CO.

HALLOWELL SHOP EQUIPMENT DIVISION SPS

JENKINTOWN PENNSYLVANIA

# the POWER TOOLS you wanted!

## New heavy duty cabinet models... by DURO

You'll be creating confidence and building enthusiasm in your workshop work when your students train on DURO POWER TOOLS. This new line has been developed to meet your specific requirements for quality, utility, safety and price. Duro power tools are years ahead in design, ruggedly built to provide a lifetime of faultless service and they incorporate the priceless safety features you must have (with moving parts protected). Students operating Duro units are learning on equipment industry prefers too — tools that are rapidly becoming the "accepted standard" on wood and metal working jobs.

**Send for FREE Power Tool Catalog and Shop Planning Guide**

See firsthand how Duro power tools will fit your shop and budget. There are many units to choose from including circular, band and scroll saws, lathes, jointers, drill presses, disc and belt sanders, etc. The Duro planning guide will give you a clear insight into proper shop planning. Write today . . . both are free.

**DURO METAL PRODUCTS CO.**

2658 N. Kildare Avenue Chicago 39, Illinois

# PRECISION HOLLOW-CHISEL MORTISER...within any school budget!

**NEW MAGIC-ACTION SLIDING-HEAD ENDS STICKING, JUMPING, POUNDING**

Powermatic engineers designed and built the Model 10 for high-production work, but it's fast becoming the most popular hollow-chisel mortiser in modern school shops! Compound table lets operator mortise at any angle, while the table rack allows successive straight-line cuts without unclamping. Direct-drive motor assures smooth operation free of noise and vibration. Precision engineered for safety, speed and simplicity!

*COMPLETE WITH 1 H.P. MOTOR**

**Powermatic makes these Safety-checked Woodworking machines**

- PLANERS
- HOLLOW-CHISEL & CHAIN MORTISERS
- JOINTERS
- BAND SAWS
- ARBOR SAWS
- TENONERS

*DEALERS IN PRINCIPAL CITIES*

**MAIL COUPON FOR COMPLETE DETAILS AND MECHANICAL SPECIFICATIONS**

#5 (HYDRAULIC) AND #15 (CHAIN SAW) MORTISER ALSO AVAILABLE

Send full details on the Model 10 Hollow-Chisel Mortiser.

Name_____

Address_____

City & State_____

MAIL TODAY TO DEPT. 8

**POWERMATIC MACHINE COMPANY**

McMinnville • Tennessee

# PLANNED Storage for Your Shop

## *What a difference this makes!*

If you're tired of seeing your class periods wasted by repeated criss-cross trips for tools, materials, and other equipment, it's time you looked over the new Sheldon Industrial Arts program.

Storage is a key factor in this program. Sheldon engineers, in association with Industrial Arts educators, have designed dozens of specialized cabinets, cupboards, and racks for tools, lumber, metal, paints, and other equipment. Everything is in order and easy to reach.

In addition the various Sheldon benches — 6-Student Work Center, all-purpose work benches, electrical benches, sheet metal benches, and others — have their own storage facilities for keeping tools and equipment at place of use.

Selected units, when arranged in a Sheldon "Educationally Correct" floor plan, keep all materials easily available to your classes at all times. There's less confusion, far less student traffic, more time for resultful work. Your Sheldon representative has complete particulars. Ask him.

*Sheldon*

"Educationally Correct"

**INDUSTRIAL ARTS EQUIPMENT**

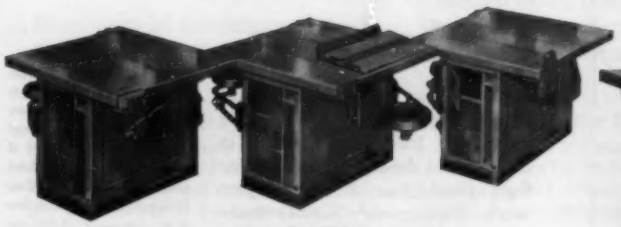
TOOL STORAGE CASE

62" L, 22" W, 83" H
Q-3900 (Wood Tools)
Q-3901 (Metal Tools)

**THIS ONE SHELDON CASE STORES 278 TOOLS OF 58 DIFFERENT VARIETIES!**

**All hand tools for a class of 24 students can be stored in this unit. Sharp tools such as chisels are located at low level to help prevent accidental injury to student removing other tools. Lower section of case is equipped with 13 fiberglass tote trays and 13 nail and screw boxes.**

NEW LOW-COST PLANNING KITS *NOW READY!*
ASK YOUR SHELDON REPRESENTATIVE



Q-1000
TOTAL EXPERIENCE INDUSTRIAL ARTS WORK CENTER FOR 6 STUDENTS

Q-2600
ALL-PURPOSE WORK BENCH FOR 2 STUDENTS

Q-4200-01
DRAWING BOARD STORAGE CASES.
Q-4200 STORES 72 BOARDS,
Q-4201 84 BOARDS.

**E. H. SHELDON EQUIPMENT CO., Muskegon, Mich.**

another reason why you get

**ASSURED QUALITY**

when you buy Greenlee tools

The craftsman who *really* knows tools can instantly see the *extra* quality in a GREENLEE 22 Solid-Center Auger Bit.

And when he puts these fine bits to work, he is assured better results, for all GREENLEE 22 Bits are of uniform high quality. In their manufacture all cutting parts, point, throat, and twist are *automatically milled* on a battery of precision machines. Cutting edges are true . . . screw points are accurate . . . squares are perfect . . . shanks never vary.

These are the quality features you want in your bits to assure good, clean workmanship every time. Be sure you get them, by asking for genuine GREENLEE 22 Solid-Center Auger Bits . . . at hardware and building supply dealers throughout the country.

Automatically producing Greenlee 22 Solid-Center Auger Bits on a special Greenlee bit-making machine for assured uniformity and quality.

**HANDY WOODWORKING CALCULATOR . . . ONLY 25c**

Converts linear to board feet, gives nail specifications, tool-sharpening tips. Compares woods, gives bit sizes for screws, concrete mixes, painting information, etc. Simple to read, 6" circular shape. Send 25c (no stamps, please).

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Auger Bits • Electric Drill Bits • Chisels and Gouges
Expensive Bits • Drawknives • Other fine tools

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FRANK PAXTON LUMBER COMPANY

# CONNECTICUT

Model U322

Only $165.00

**UNIVERSAL BENCH BRAKE for school shops**

A quality tool accurate and easy to operate. Versatility makes it ideal for training. Popular in commercial sheet metal shops for light production, box and pan work. Replaceable bronze bushings provide long machine life. Available in 3 and 4 ft. models, universal or plain. Write for Bulletin U 3221.

Rated Capacity: 1/8 flange on 22 gage mild steel, full brake length. Fingers of case hardened steel in widths of 2, 3 and 4 inches permit 3 inch box and pan depth. Other Prices of the Bench Series:

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|---|---|
| 4 ft. Universal, | $220.00 |
| 3 ft. Plain, | 114.50 |
| 4 ft. Plain, | 134.50 |

All prices F.O.B. Old Saybrook, Conn.

**W. WHITNEY STUECK, INC.**
Old Saybrook, Conn.

# Pittsburgh COLOR DYNAMICS® plays an increasingly important part in improving productive efficiency

**Skilled shopmen of tomorrow must know how to use this modern painting system to improve production and morale of workers.**

**THE skilled shopman** of tomorrow must know more than how to use metals, machines and methods. He must be familiar with the ways in which color can be put to work to improve productive efficiency and morale, and to reduce danger of accidents. That's why many educators in vocational studies now include Pittsburgh's system of COLOR DYNAMICS in their training courses.

**Many types** of industries are using this painting method to improve working areas. Among these is the E. W. Ferry Screw Products, Inc., of Cleveland, Ohio, which produces more than a million and a half fasteners of many kinds for automotive, airplane and household appliance manufacturers.

**Here focal colors** are used on working parts of machines and eye-rest colors on stationary parts to help workers see their jobs better. Restful colors on walls and ceiling relieve eye strain and reduce physical fatigue. Safety colors to denote hazard areas lessen danger of accidents. This has contributed to better workmanship and better relations between management and workers.

**Educators recognize** that greater knowledge and more widespread use of this method of painting is making important contributions to the future productivity and welfare of employees.

**If you want your students** to be better equipped for tomorrow's tasks, begin now to teach them the principles of Pittsburgh's system of COLOR DYNAMICS. You can easily demonstrate its principles in a practical manner. Apply them in the decoration of your classrooms and equipment.

## We'll be Glad to Make a FREE Color Plan for Your Classrooms

● Write today for a free copy of our booklet explaining how COLOR DYNAMICS improves productivity, morale and safety in a plant. Better still, we'll provide a free color plan of your classroom areas and equipment without cost or obligation. Call the Pittsburgh Plate Glass Branch nearest you and arrange to have a color expert see you at your convenience. Or mail this coupon.

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# HOW-TO project for the School Shop

—by NICHOLSON FILE COMPANY

NO. 21 OF A SERIES

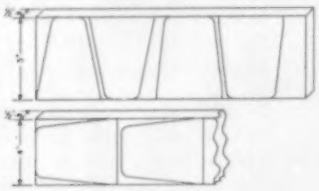
## ALUMINUM BOOK ENDS

**Raw Materials Required:** One pc. aluminum sheet 24 S-T or similar, 1/2" x 4" x 24" **or** 1/2" x 5" x 16", depending on height desired; one pc. aluminum bar 24 S-T or similar, 2" x 2" x 4 1/4"; six pcs. Allen head cap screw, 10-32 x 3/4" long; rubber cement; sheet felt for base, 5" x 10".

**Tools:** Hacksaw or metal bandsaw; layout dye; scriber; 6" scale; 6" combination square; No. 21 drill; 3/16" drill; 5/16" counterbore; No. 10-32 hand tap; tap wrench; small center punch; 4-oz. ball-peen hammer; 5/32" Allen wrench; No. 200 and No. 150 emery cloth; No. 00 steel wool; safety-edge razor blade; 2" or 4" dividers; Nicholson 10" Flat Superior file, Rigid Type, with Tang; Nicholson 10" Flat Aluminum file.

### PROCEDURE

**1.** Lay out four main components. Stagger the layout as shown so that one saw cut will take care of two edges. Prior to working the 1/2" stock, coat surface with layout dye. Incorporate on the base layout the two parallel sides to match with the 1/2" thickness of the vertical riser. If stock has smooth edge, use it for a finish side to save hand work.



**2.** With a hand or metal-cutting bandsaw (16 pitch blade), cut blanks within 1/64" to 1/32" of the layout lines, if possible.

**3.** With the Nicholson 10" Flat Superior file remove excess metal to within scribe line thickness of finish. Use bench vise to secure work while filing. File all four blanks.

**4.** Finish-file to the line with Nicholson 10" Flat Aluminum file. Brush file frequently to prevent pinning and clogging.

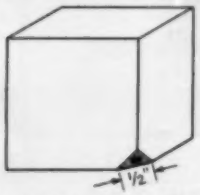
**5.** Lay out the three bolt holes in the base, using the 6" scale, scribe, center punch and hammer. When center punched, drill a 3/16" hole at each prick point. Counter-drill these holes 5/16" deep to receive Allen head cap screws.

**6.** Clamp the upright in a bench vise and, with the aid of an assistant, place the base on this surface. While holding it square, place a 3/16" drill in the drilled holes and tap lightly in each hole for a good transfer point. Drill and tap each set of holes with a 10-32 tap. Remove all burs.

**7.** Tear a 1" wide strip of No. 150 emery paper, fold over the face of any flat file, and work over the filed edges, removing all nicks, scores and tool marks. Follow same procedure with a strip of No. 200 paper, to remove marks of the coarser paper.

**8.** Remove scratches on blank surfaces by placing a sheet of No. 200 paper on a flat surface (like a cold-rolled steel plate), and rub surfaces until clean. Remove all sharp edges created by this operation, using same emery cloth.

**9.** Final phase is making the ornament, design of which may be left to each craftsman. This project uses a simple block of aluminum, mounted on one corner as shown. A block of 2" square aluminum is cut 1/32" plus in length; two are required. Finish them as previously described. Bring all surfaces to smooth finish.

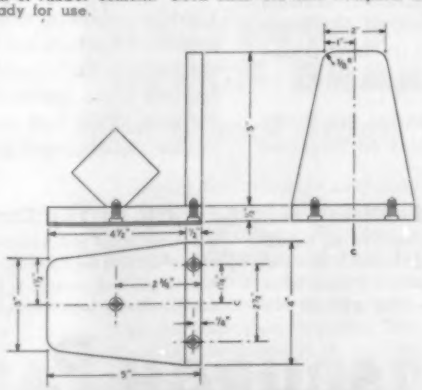


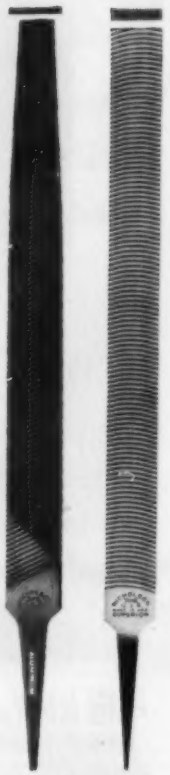

**10.** One corner of each block is filed with the Nicholson 10" Flat Aluminum file. Keep the flat to 1/2" at its widest point. Remove all burs, then drill and tap each with a 10-32 tap.

**11.** Assemble book ends without the blocks. Four 10-32 x 3/4" long Allen bolts are used for fastening. Secure with an Allen wrench. Then hand-rub assembly and blocks with No. 00 steel wool until a highly polished surface appears.

**12.** To save the cost of electrolytic processing, apply two coats of flat, dull black spray to the book ends. When dry, attach blocks.

**13.** Finally, put felt scuff base in place. Trim two sheets, using base as template. Fasten felt to base with a thin film of rubber cement. Book ends are now complete and ready for use.





*The Nicholson Aluminum and Flat Superior files are shown in sizes reduced from those specified in the text.*

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Industrial Arts and Vocational Education
The Shop Teachers' Professional Magazine
APRIL 1957

# . . . "And the Problems of Life Related to These Changes" . . .

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State Univ. Teachers College
Oswego, N. Y.

**FRANK A. SCHOLFIELD**
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Twenty-five years ago Bonser defined industrial arts as the study of the "changes made by man in the forms of materials to increase their values, *and of the problems of life related to these changes.*" More recently, Wilbur offers his definition as "those phases of general education which deal with industry — its organization, materials, occupations, processes, and products — *and with the problems resulting from the industrial and technological nature of society.*"

Furthermore, every responsible spokesman for the field in the intervening years has included in his definition of industrial arts some reference to social problems.

Why is it, then, that this part of the job is so neglected? This article attempts to identify some of the more significant "problems" which our industrial way of life has brought about and to suggest some of the ways in which we, as industrial arts or industrial-vocational teachers, may be able to deal with them in our teaching.

### Automation a Continuation of the Process of Mechanization

Let us begin by stating that industry, which gives our field its direction, is characterized today by mechanization and, increasingly, automation. Despite the popularity of the term, automation is fundamentally a continuation of the process of mechanization that has been going on for at least 150 years and which can, in turn, be traced back thousands of years to man's first tool. Automation is the contemporary development in the long productive process which throughout man's history has moved always from the simple toward the more complex. It is not the end, but only a stage in man's industrial-technical development.

### An Upgrading of Skills Is Required in the Present Era

In the beginning, mechanization — as illustrated by the establishment of the factory system — resulted in an initial *downgrading* in skill as the individual craftsman, producing the entire product by hand, gave way to the machine operator producing only a small part of the product under an extensive division of labor. However, once the factory gained dominance in the productive process, and particularly since the development of automation, there has occurred a general *upgrading* of skill. This upgrading is not in the direction of a return to handicraft skills, but rather a result of the increased demand on the part of industry for the worker with a more complete technical understanding of more complicated machines and what they can do. The time is passing when a worker can be "broken in" on his machine in a week or less. From the point of view of shop teachers, this demand for more and more skill at all levels of work means that we can forget about problems of "overeducating" for fear there will be no one willing to do the so-called "dirty work" of society. The amount of such work available and necessary is decreasing each year. At the moment, the American worker is pitifully *undereducated* and *underskilled;* employers beg him to get just a little technical knowledge so that he can receive higher wages in a more demanding job.

These very changes in the productive process, however, make it clear that the vocational and prevocational significance of the handicraft skills is constantly decreasing. The techniques required to build an end table or a set of

andirons by hard processes are so far removed from the complexities of our industrial system that the vocational worth of such skills is open to serious doubt. This is not to say that handicrafts have no place in school shop programs, but rather that they can do only a part of the job that needs to be done. It is clear that industrial-arts teachers have a dual responsibility: (1) imparting the avocational, artistic, and creative skills in the handicrafts and, (2) developing an understanding of the industrial basis of our society through a combination of technical knowledge and skill combined with abstract reasoning. It is suggested that separate approaches are required in industrial-arts education if these separate and distinct objectives are to be fully realized. One possibility worthy of our serious consideration is the establishment of *nonshop* industrial-arts courses in addition to the shopwork approach with its traditional emphasis on manipulative skill.

### Proper Attitudes Both to Work and Leisure Must Be Developed

Another factor related to the increased mechanization and automation of our society is the continuing decline in the importance of "work" at least as far as the traditional meaning of the term is concerned. With the coming of the 40-hour week, paid vacations and holidays, social security and pensions, and with the 30 or even 20-hour work week definite possibilities within the next generation or two, it is clear that new attitudes toward both work and leisure time must be developed. It is equally clear that industrial-arts education, with its unique concern with both the industrial process and the handicraft skills, is in a position to play an important role in preparing the student to meet the challenges of life in a rapidly changing society. On the one hand, we can help the individual to understand *what* is happening as automation alters his way of life; and on the other, we can aid him in his desire to retain worthwhile creative and artistic values in the face of these inevitable changes.

The rise of mechanization and automation poses yet another problem of particular importance to industrial arts and vocational educators. Despite some recent changes in emphasis, it is obvious that some public school systems remain pointed toward the traditional college preparatory course. Consequently, such systems reserve the highest prestige for the students who are successfully pursuing the academic courses. We all know that a large number of students are simply tolerated in these so-called academic courses until they can be discarded *down to the shop*.

There can be no denying that it is an extremely serious educational situation when such areas as English, mathematics, science, and social studies *give up* on the very students who — on the record — are most in need of what these subjects have to offer. It is almost superfluous to note that the people in this rejected group, for better or for worse, do go on to become citizens in our democracy.

While the situation is undeniably unfortunate, it does have a positive side as far as industrial arts and vocational teachers are concerned. Such rejected young people tend to be bitter and frustrated when they come into the shop. We are, in a very real sense, their last educational hope for they are only one short step from the dull hopelessness of the street corner. It is the challenging task of industrial arts and vocational education to point out to this group that there is more than one path leading toward a satisfying life. We must impart some of the exciting prospects open to the individual in an automated society. In terms of his own abilities and limitations, each person must learn how he can make a place for himself. In short, he must be given back his self-respect.

This is certainly a large order for any area in our educational system to undertake but it is only part of the task posed for industrial arts and vocational education by the nature of automation and the industrial process in general. An individual cannot develop self-respect unless he is the recipient of respect from others. In his contacts with teachers and students who have only a casual interest in shop subjects, the instructor in our field must utilize every opportunity to suggest that the requirements for workers in our industrial age are changing and that the traditional dichotomy between "white-collar" and "blue-collar" is decreasing. We must promote these new attitudes in the academic areas of our educational system without allowing ourselves and our students to become anti-intellectual, natural though this reaction to the present situation might be. In a closely organized society where different groups are functionally interrelated, we can ill-afford to tolerate the hostility of one group toward another.

These, then, are some of the "social problems" facing the fields of industrial arts and vocational education. Few would deny that they constitute a most difficult and a most challenging educational assignment.

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If asbestos boards are to be used on a basement wall, the back should be given a thinned coat of fresh, white shellac. — *Shellac Information Bureau.*

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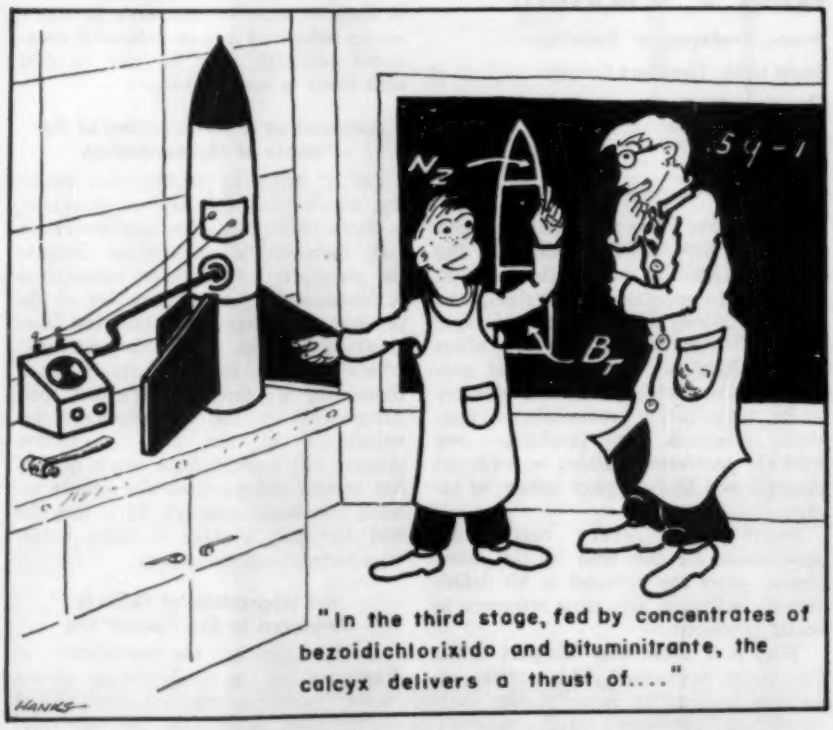
$N_2$
$B_T$
"In the third stage, fed by concentrates of bezoidichlorixido and bituminitrante, the calcyx delivers a thrust of...."
HANKS

— William S. Hanks, Department of Industrial Arts, Western Illinois State College, Macomb, Ill.

# Doctor's and Master's Degrees with Theses Granted in Industrial Education 1930 to 1955

**DR. RAY C. DOANE**
and
**DR. H. H. LONDON**
Industrial Education
University of Missouri
Columbia, Mo.

It should be made clear that this *is not* a report of *all* the degrees conferred with a major in industrial education; many degrees have been granted without a thesis requirement and, hence, are not counted. While most of the colleges and universities submitted annotations and summaries, a few did not. Below are shown the number of doctor's degrees in industrial education as reported by co-operating institutions from 1930 to 1955.

A committee representing the National Association of Industrial Teacher Educators has undertaken the task of compiling and reporting the titles, annotations, and summaries of researches done in industrial education from 1930 to August, 1955. Studies reported in two previous publications prepared by this committee are to be combined with studies completed since 1950. Titles, annotations, and summaries of all these studies will be contained in one volume and published by the U. S. Office of Education. The purpose of this publication will be to make available to teacher educators, research workers, and classroom teachers information about the kinds, extent, and findings of completed research in industrial education.

All colleges and universities in the United States were asked to submit annotations or summaries of the researches done by their staff and students to a designated member of the committee. Each member of this committee functioned as a collection agency for the research summaries in the geographical sector of the United States for which he was responsible. All reports were forwarded to the committee chairman, Dr. C. Kenneth Beach, Cornell University, for the first two publications, and Dr. H. H. London, University of Missouri, for the third publication. With the aid of research assistants, summaries were edited and adjusted to a uniform format. In the new publication, studies available on microfilm are so indicated.

**Doctor's Degrees Granted in Industrial Education**

| *Institution* | *1930 to 1948* | *1949 to 1950* | *1951 to 1955* | *Total* |
|---|---|---|---|---|
| New York University | 26 | 13 | 30 | 69 |
| University of Missouri | 9 | 11 | 34 | 54 |
| Ohio State University | 24 | 3 | 8 | 35 |
| Pennsylvania State University | 13 | 6 | 9 | 28 |
| Columbia University | 15 | 0 | 6 | 21 |
| University of Pittsburgh | 9 | 5 | 4 | 18 |
| University of Michigan | 2 | 8 | 3 | 13 |
| University of Minnesota | 3 | 0 | 10 | 13 |
| Indiana University | 7 | 1 | 4 | 12 |
| Stanford University | 5 | 2 | 3 | 10 |
| University of California, Berkeley | 6 | 1 | 2 | 9 |
| University of Florida | 0 | 0 | 8 | 8 |
| University of Pennsylvania | 4 | 3 | 0 | 7 |
| New York School of Industrial and Labor Relations | 2 | 4 | 0 | 6 |
| University of Maryland | 0 | 3 | 3 | 6 |
| Oregon State College | 0 | 1 | 4 | 5 |
| Purdue University | 3 | 1 | 1 | 5 |
| Temple University | 4 | 0 | 0 | 4 |
| University of Texas | 4 | 0 | 0 | 4 |
| Cornell University | 3 | 0 | 0 | 3 |
| Harvard University | 3 | 0 | 0 | 3 |
| University of California, Los Angeles | 3 | 0 | 0 | 3 |
| Yale University | 3 | 0 | 0 | 3 |
| Bradley University | 0 | 1 | 1 | 2 |
| Rutgers University | 0 | 2 | 0 | 2 |
| University of Colorado | 0 | 2 | 0 | 2 |
| University of Connecticut | 0 | 0 | 2 | 2 |
| University of Illinois | 2 | 0 | 0 | 2 |
| University of Oklahoma | 0 | 0 | 2 | 2 |
| University of Southern California | 2 | 0 | 0 | 2 |
| Bryn Mawr College | 1 | 0 | 0 | 1 |
| Catholic University of America | 1 | 0 | 0 | 1 |
| Colorado State College | 0 | 0 | 1 | 1 |
| Colorado State College of Education | 0 | 0 | 1 | 1 |
| Fordham University | 1 | 0 | 0 | 1 |
| George Washington University | 1 | 0 | 0 | 1 |
| Iowa State College | 0 | 0 | 1 | 1 |
| Massachusetts Institute of Technology | 1 | 0 | 0 | 1 |
| Northwestern University | 1 | 0 | 0 | 1 |
| University of Buffalo | 1 | 0 | 0 | 1 |
| University of Chicago | 0 | 1 | 0 | 1 |
| University of Cincinnati | 0 | 1 | 0 | 1 |
| University of Iowa | 1 | 0 | 0 | 1 |
| University of Kansas | 0 | 0 | 1 | 1 |
| University of Nebraska | 1 | 0 | 0 | 1 |
| Wayne University | 0 | 0 | 1 | 1 |
| Western Michigan State College | 1 | 0 | 0 | 1 |
| Western Reserve University | 1 | 0 | 0 | 1 |
| *Totals* | 163 | 69 | 139 | 371 |

Requirements for the master's degree vary considerably among the institutions of higher learning. Many require a thesis, some require special reports, and others require additional course work in lieu of the thesis. A recent study by Dr. R. G. Kohler, "Graduate Industrial Teacher Education," reported a definite trend toward minimizing and eliminating the thesis requirement at the master's degree level. Consequently, those institutions granting master's degrees with a major in industrial education without the thesis requirement are not shown. For example, the University of Missouri has granted 268 master's degrees in this field since 1930 but is not listed below.

The number of master's degrees granted in industrial education, with theses, reported by co-operating institutions follow.

### Master's Degrees With Theses Granted in Industrial Education

| *Institution* | *1930 to 1955* |
|---|---|
| Iowa State College | 307 |
| Ohio State University | 277 |
| University of Minnesota | 239 |
| Colorado Agricultural and Mechanical College | 232 |
| Oklahoma Agricultural and Mechanical College | 201 |
| Kansas State Teachers College | 177 |
| Stout State College | 153 |
| Oregon State College | 126 |
| Wayne University | 114 |
| University of Tennessee | 102 |
| North Texas State College | 98 |
| Texas Agricultural and Mechanical College | 96 |
| University of Southern California | 88 |
| University of Michigan | 87 |
| Colorado State College | 85 |
| Pennsylvania State University | 56 |
| Cornell University | 53 |
| University of Florida | 43 |
| University of Pennsylvania | 41 |
| University of Maryland | 39 |
| Louisiana State University and Agricultural and Mechanical College | 36 |
| Stanford University | 36 |
| George Peabody College | 35 |
| Purdue University | 35 |
| University of Pittsburgh | 35 |
| University of Cincinnati | 32 |
| Indiana State Teachers College | 23 |
| University of Wisconsin | 23 |
| Chico State College | 22 |
| University of Colorado | 22 |
| Illinois State Normal | 21 |
| University of Buffalo | 20 |
| North Carolina State College | 19 |
| University of Texas | 18 |
| Indiana University | 17 |
| Kent State University | 16 |
| St. Louis University | 15 |
| University of Iowa | 15 |
| Catholic University of America | 14 |
| Miami University of Oxford, Ohio | 13 |
| New York University | 12 |
| George Washington University | 12 |
| Claremount College | 12 |
| Bowling Green State University | 11 |
| South West Texas State Teachers College | 11 |
| Temple University | 11 |
| Ohio University | 10 |
| Columbia University | 10 |
| Tennessee Agricultural and Industrial University | 10 |
| Middle Tennessee State College | 10 |
| University of Chicago | 10 |
| Boston University | 8 |
| Brown University | 8 |
| Sam Houston State Teachers College | 8 |
| University of Utah | 8 |
| Arizona State College | 7 |
| University of California, Berkeley | 7 |
| University of California, Los Angeles | 7 |
| Massachusetts State College | 6 |
| Central Washington College of Education | 6 |
| Syracuse University | 6 |
| Municipal University of Wichita | 5 |
| Southern Methodist University | 5 |
| University of Alabama | 5 |
| University of Nebraska | 5 |
| Western Kentucky State College | 5 |
| West Virginia University | 5 |
| University of Kansas | 5 |
| Kansas State Teachers College, Emporia | 4 |
| Rutgers University | 4 |
| Massachusetts Institute of Technology | 4 |
| University of Virginia | 4 |
| Prairie View Agricultural and Mechanical College | 3 |
| Northwestern University | 3 |
| University of Oregon | 3 |
| University of Denver | 3 |
| Mississippi State College | 3 |
| University of Rochester | 3 |
| University of Washington | 3 |
| University of Wyoming | 3 |
| Western State College of Colorado | 3 |
| West Texas State Teachers College | 3 |
| Western Washington College of Education | 3 |
| Western Michigan College | 3 |
| Boston College | 3 |
| City College of New York | 3 |
| Fresno State College | 3 |
| Hampton Institute | 3 |
| San Diego State College | 2 |
| San Francisco State College | 2 |
| Tulane University | 2 |
| University of Akron | 2 |
| University of Hawaii | 2 |
| University of Louisville | 2 |
| University of Oklahoma | 2 |
| Wittenberg College | 2 |
| Virginia Polytechnic Institute | 2 |
| Virginia State College | 2 |
| Agricultural and Mechanical College of North Carolina | 2 |
| Florida State University | 2 |
| Montana State College | 2 |
| Rhode Island College of Education | 2 |
| Marquette University | 2 |
| Smith College | 1 |
| Tennessee Agricultural and Mechanical University | 1 |
| University of Arizona | 1 |
| University of Illinois | 1 |
| University of New Mexico | 1 |
| University of North Carolina | 1 |
| University of North Dakota | 1 |
| University of Notre Dame | 1 |
| University of South Carolina | 1 |
| University of South Dakota | 1 |
| Washington State College | 1 |
| Weber College | 1 |
| Western Reserve University | 1 |
| Butler University | 1 |
| Duke University | 1 |
| Howard College | 1 |
| Iowa State Teachers College | 1 |
| Marywood College | 1 |
| New York State College for Teachers | 1 |
| North Eastern Teachers College, Oklahoma | 1 |
| *Total* | 3420 |

According to the reports received, 48 institutions grant doctor's degrees in industrial education. Ten of these institutions granted 73 per cent of the total. While 132 institutions reported master's degrees in industrial education, with theses, 76 per cent were granted by twenty institutions.

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A powerful new 107-ton railroad rotary snow plow now is being manufactured for the Army.

The plow will throw approximately 300 tons of snow per minute, casting it as far as 110 feet in any direction at any chosen angle.

The plow was developed as an all-purpose snow removal unit for possible use in military railway operations overseas. It is electrically driven. Most previous plow units of this size have been steam operated. — *Information Section, Wisconsin Military District.*

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The Department of the Army is an administrative complex that requires the civilian services of people in more than 1200 occupations ranging from laborer to research physicist, from file clerk to skilled machinist and from automotive mechanic to procurement specialist. — *Public Information Office.*

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Three coats of shellac can be applied to a floor and it can be walked on in a day due to its fast-drying qualities. Thinned white shellac that is fresh and pure should be used. — *Shellac Information Bureau.*

# What Can We Do for Slow Learners in Industrial Education

**ARTHUR A. DICK**

Supervisor, Vocational Education and Industrial Arts

Baltimore County Public Schools
Towson, Md.

As school systems grow and pupils are grouped homogeneously, the problem of how to cope successfully with slow learner classes comes to the front. For clarification we think of the slow learner class in the I.Q. range of 75–85.

In present-day education we try to teach all the children of all the people. Industrial arts is a part of general education. In many school systems classes at the junior high school level are grouped homogeneously. The lower I.Q. classes pose the problem, "How can we best teach slow learners?" Many teachers of academic subjects as well as industrial arts readily admit that they are at a loss as to how to teach slow learners effectively. The problem seems to be more acute at the junior high school level than in the senior high school.

It will be assumed here that there are three classifications to consider and explore for this article: one, required industrial arts in the junior high school; second, free elective industrial arts in the senior high school; and, third, trade and industrial courses in the senior high school, such as auto mechanics, machine shop, woodworking, electricity, and printing. Of course, entrance to these vocational industrial courses is based on selection factors as interest, testing, aptitudes, and parent approval.

### The Challenge

We recognized the problems in teaching the slow learner in industrial education so we used the following procedure to try to find some of the answers. We also accepted the positive philosophy that there is something worthwhile which every pupil can do reasonably well. Let's try to find it!

### Procedure

A professional meeting of Baltimore County industrial-education teachers was held at one of our high schools. The theme of the meeting was — "What Can We Do for the Slow Learner in Industrial Education?" This meeting was an experiment in group dynamics procedures. The main group of teachers was divided into seven smaller working groups with a leader and a recorder in each group. An additional committee summarized the results of the small group conferences.

In industrial education teaching *our* philosophy is that variances in pupil ability can be partly cared for through

Students in the trade and industry courses; (at right) students in the senior high school industrial arts classes
— Photographs by Karl V. Sloop, assistant in audio-visual aids, Board of Education of Baltimore County

careful planning for individual differences and through individual instruction.

Following is a summary of the *decisions, suggestions,* and *ideas* of the seven groups for various shop offerings and grade levels related to slow learners; this is what a number of shop teachers think and believe.

Group A — *Junior High Drafting for the Slow Learner* (Industrial Arts)

- Simplify terminology so that the pupils will understand what is being discussed or presented to them (edge instead of surface, pattern instead of design).
- Only dimensions that a pupil can measure and understand should be used in each progressive drawing assignment (example: 1 in., ½ in., ¼ in., etc.).
- Standardize on one size capital letters for lettering and insist on it being followed.
- Try to make the drawing assignment as practical as possible with some utilitarian value.
- Slow learners have success with simple geometric patterns, one view drawings, transfer of design to smaller or larger sizes, and the use of graph paper for bar graphs and individual capital letters.
- Slow learners are successful, stimulated, and interested in using colored crayon or pencils for coloring geometric designs and game boards.

Group B — *Junior High Woodwork for the Slow Learner* (Industrial Arts)

- Give consideration to the pupils' mental age as well as I.Q.
- Give serious thought to the increased potential safety hazard of the slow learner.
- Persuade the slow learner to work within his ability and not above it as he oftentimes desires to do.
- The use of patterns is justifiable when necessary to aid in the teaching of measurement.
- Projects which can be completed in a short length of time should be used due to the short interest span of the slow learner.
- Objectives and standards of workmanship must be modified if we are to have the slow learner meet with success.
- Pair slow learners with pupils of higher abilities so that some assistance may be readily available for the slower of the two (the 75 I.Q. with the 85 I.Q.).
- Slow learners are prone to turn to their peers for assistance.
- Slow learners should be assigned to a shop for only single periods.
- The interest span of the slow learner is too short for double period instruction.

Group C — *Junior High Metalwork for the Slow Learner* (Industrial Arts)

- Give individual instruction as far as possible.
- Get academic core teacher to help in planning projects and activities.
- Teach through simple projects: toys, rings, bracelets, hammer head, letter opener.
- Teacher must have patience and use praise to a noticeable degree.
- Modify the standards without letting the pupils know.
- Consider one piece projects whenever possible.
- Use projects that do not require close measurements.
- Utilize organization and participation.

Group D — *Senior High Drafting for the Slow Learner* (Industrial Arts)

- Most senior high pupils should have a basic drawing experience.
- Allow senior high students in drawing to choose the area of their interest within their abilities.
- Limit work to simple tasks.
- Manipulative work is appealing to a slow learner if he is successful.
- Where possible have all slow learners in one class or group.
- Let slow learners set their own pace.
- Projects for the slow learner — charts, pencil tracings, simple picture drawings, map work, blueprinting, small jobs around the shop.

Group E — *Senior High School Woodworking for the Slow Learner* (Industrial Arts)

- Slow learners should be placed in groups by themselves whenever possible.
- Individual instruction is essential.
- Since the tenth grade is terminal for many pupils, they should be instructed in the correct use of basic woodworking hand tools.
- Pupils properly taught and supervised can operate many machines with safety to themselves and others.
- The pupil's proper attitude is more important than whether he is a slow learner, average, or a fast learner.
- Instructors should conform to safety rules and practices in order that he may set a good example for his pupils to follow.

Group F — *Senior High General Metals for the Slow Learner* (Industrial Arts)

- Have the slow learner perform repetitive operations on one machine for a greater length of time than is now the case.
- Substitute the desire of the slow learner to operate machinery with hand tool work.
- Require the slow learner to use a working drawing, bill of material, and work procedure within his ability.
- Usually the slow learner takes a great length of time to finish his written related work, thus the teacher has a legitimate reason for keeping the student off a dangerous machine.
- In a heterogeneous class do not spend more time with a slow learner than with a fast learner.
- Let slow learners select from a variety of simple projects.
- Books and planned resource material are in constant need for all levels of instruction.
- General metals teachers should develop successful project plans and exchange ideas with other teachers.

Group G — *Vocational Offerings for the Slow Learner* (Trade and Industry — Auto Mechanics, Machine Shop, Woodworking, Printing, and Electricity)

- Pupils should not be in a situation which is hazardous.
- Slow learners should be assigned to jobs which have repetitive values.
- Production jobs have values.
- A testing program should be used for the selection of vocational pupils.
- Pupils should be grouped according to their ability.
- Slow learners need guidance in job placement.
- Employers should be aware of the limitations of slow learners.
- Work experience and co-operative programs have possibilities.

### Conclusions

The problem school systems face, is — "How can we best teach slow learners?" Because we teach all of the children we have greater numbers of pupils in this classification.

In summary some of the key solutions in teaching slow learners appear to be:

1. *Simplify* teaching as to terminology, dimensions, operations, procedures.
2. Projects should be *practical* and within the *pupil's ability*.
3. Provision should be made for the *success* of the slow learner.
4. *Individual instruction* is still an up-to-date method for the teachers to use.
5. More time and *repetition* are needed for reasonable results.
6. The teacher should *understand* and know a lot about the *individual* pupil.
7. *Manipulative* work is a natural for the slow learner.

Some of the answers are known in teaching slow learners. However, teachers need more training or specializations in methods of instructing these pupils especially when they are grouped homogeneously. There is need for more research, experimentation, and new ideas.

# An Occupational Information Technique

**J. HENRY ZANZALARI**
Guidance Counselor
Middlesex County Vocational and Technical High School
New Brunswick, N. J.

The basic principle of the trade exploratory program is to present to the student the maximum amount of occupational information so that he may make an intelligent selection of his life's work. This basic principle includes five objectives:

1. To teach certain basic skills of value regardless of the trades eventually studied;
2. To assist the student in discovering his capacities and desires for learning a trade;
3. To allow the student to investigate the job opportunities, working conditions, advantages and disadvantages of a given trade;
4. To provide the student with an opportunity to learn what it requires in study, skills, and years of experience to become a tradesman;
5. To provide the student with a background of knowledge and experience which will enable him to understand and appreciate the complexity of industrial life.

The first objective is limited primarily to the shop instructor. The remaining four objectives are responsibilities to be shared by the shop teacher, the guidance department, and other members of the faculty who function as a part of the exploratory program. The faculty as is represented here is a formidable team of experience and knowledge. They are the heart of the exploratory mechanism and upon them depends the success or failure of the pupils' participation.

The practice of inviting successful tradesmen into the school to speak to the students is a guidance technique that can aid in satisfying the stated objectives. Such representatives appearing before the students in an open forum can disseminate a wealth of occupational information.

Basic planning for such an undertaking is very important. It must be reviewed with the speakers, with the faculty, and with the students so that

Mr. John Pecoraro, business agent, Painters Local #834, New Brunswick, N. J., is shown speaking to the freshman class of the Middlesex County Vocational and Technical High School, New Brunswick, N. J., about the painting trade

— Photograph by Charles F. Green, school photographer

all may understand the program in its proper proportions as an occupational information technique. The speaker should be furnished with a suggested outline of the points to be covered in his assigned trade. This outline should necessitate answering trade questions concerning job requirements, opportunities, advantages, disadvantages, methods of entry and types of work. The faculty should be shown the objectives so that they too can broaden the meaning of the program for the students. Finally, the students should be given a thorough orientation. This can be more readily accomplished if a guidance course is taught in co-ordination with the shop exploration.

A representative of each trade studied at the school can be scheduled at intervals of one week. He should speak for approximately twenty minutes with additional time allotted for student questions. The speaker should be chosen carefully. He should be a person thoroughly familiar with the trade, if possible, one who has been graduated from the school, served his apprenticeship, and is now a journeyman or above in his trade. The graduate who usually considers it an honor to return to his school as a consultant is a great potential for pupil motivation. The use of a variety of visual aids should be encouraged. The more diversified the program, the greater interest expressed by the students. The guidance counselor can effectively conclude the program with a short summary of what has been presented in this and previous meetings.

This type of program has many facets beyond its original and most important purpose. It serves as an excellent source of public relations. Pictures of the forum may be taken and, together with an appropriate article, can be featured in the local newspaper and even in the industrial or trade magazines. Finally, the program can serve as an opportunity for acquainting consultant business agents and personnel managers with the school curriculum. This naturally leads to greater placements.

# It Pays to Display

**ARTHUR A. DICK**

Supervisor, Vocational Education and Industrial Arts

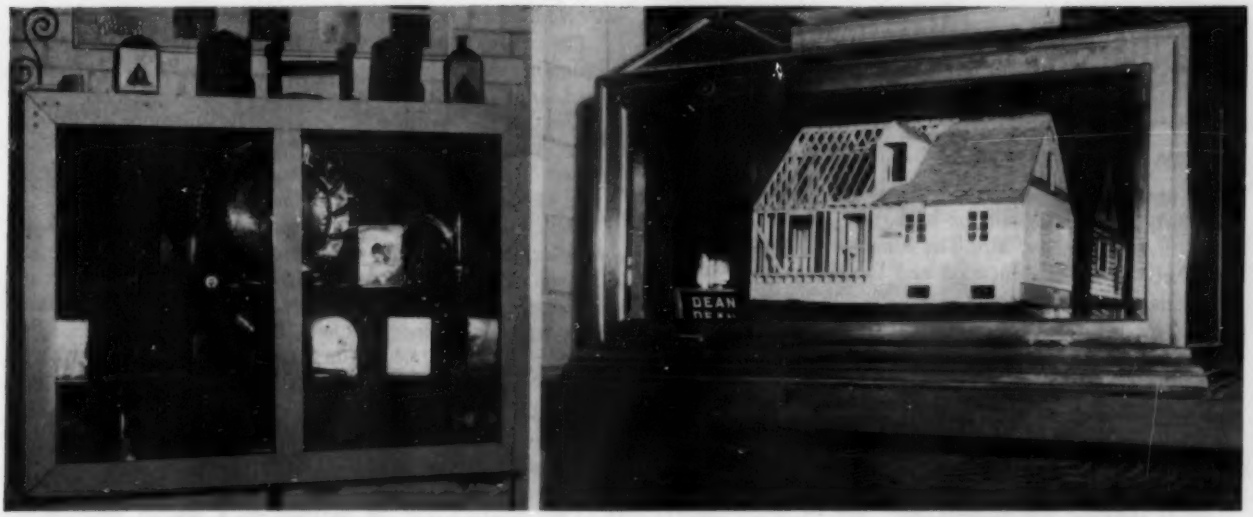
Baltimore County Public Schools

Towson, Md.

Exhibits of various kinds are among the effective public relations media which we, in education, have at our command. People are inclined to remember what they see, especially if it is vivid, moving, unusual, and colorful. A quality exhibit can impart a favorable and lasting impression to those seeing it as well as to those who have participated in producing the things displayed.

Industrial education exhibits can utilize projects, examples of industrial processes, and visual teaching aids. In our shops a project usually results, although in our philosophy of teaching the project is a means to an end and not an end in itself. However, since we are fortunate to have a tangible result and product it is natural wisdom to show it off. Some of the more practical means of displaying the products and

Pupil participation at open house; (at right) parents visit the school shops



An example of a wall show case in the school shop; (at right) the portable showcase in the school corridor

activities of shop teaching are — the pupil-participation open house, the corridor showcase in the school, the showcase in the shop, the booth at a fair, and the display window in the community shopping center.

### The Open House Exhibit

Of the kinds of exhibits mentioned it is our opinion based on experience that the pupil-participation type is probably the most efficacious and worthwhile. However, the other types of displays have great merit and certainly should be utilized from the standpoint of variety. The pupil-participation type of open house exhibit is usually held from 7 p.m. to 8 p.m. preceding a regularly scheduled P.T.A. meeting and is an annual affair. Quality projects and representative visual teaching aids are displayed; also, pupils are seen at live work on machines and at bench work stations. This setup is in reality a well-planned shop class in actual operation with added trimmings. Through proper planning an exhibit of this kind can continue to show yearly growth in attendance and in function.

The purpose of an industrial-education exhibit is to focus the purposes and attainments of the department to the attention of pupils, parents, school officials, business, industry, and the community. It is an opportunity for parents to see their boys and girls in a real activity role in a school situation. It is a favorable occasion to present visual shopwork and manipulative operations in an animated and interesting manner.

### Planning and Conducting the Display

The open house pupil-participation exhibit should be carefully planned well in advance of the actual date. Pupil-made projects should be selected from the regular shopwork produced by the various grades. There should be emphasis on diversity of projects, and quality should be stressed rather than quantity. Volunteer pupils should be screened for work at machines and at bench work stations, and their activities should have real meaning and not be busy work. Posters are helpful in directing people to the locations of the various shops in the school building; student ushers can also be used for this purpose. The open house can be advertised and publicized through the P.T.A., home-room announcements, the school paper, newspapers, radio, television, school bulletins, assemblies, and by pupils themselves. Signs and announcements can be made by the printing department or through the silk screen process if no print shop is available. Extensive and directed publicity pays off toward the success of a school shop exhibit.

On the exhibit night, arrangements should be formulated to have the shops open at least one hour before the general meeting — as for instance the P.T.A. meeting. Select reliable pupils to look after small projects and displays and for the purpose of offering explanations and information to visitors. It is good practice to see that each project and visual aid has a neat paper name plate or tag giving such information as name of project, its use, pupil's name and grade. From the standpoint of safety, arrange for clear aisles and eliminate any hazards; take every precaution to prevent accidents to pupils and to visitors. The exhibit should be organized and planned in detail so that it is attractive, fast moving, and colorful: use table covers, streamers, lighting, color, projectors, sound systems, and signs.

To increase the scope and interest factor of the exhibit, co-operation is recommended with other school areas as for instance the home economics, agriculture, and art departments in order to make the exhibit a whole school affair. In large school systems several schools may be represented at a central location thus having a city-wide or county-wide exhibit as the case may be. A well-planned exhibit can be an excellent pupil-learning activity in community relations. The pupil-participation exhibit offers an effectual means of displaying to the public tangible results of our industrial-education teaching. In present-day education it pays to publicize and to display.

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Consensus on Automation at the congressional hearings held by the Joint Committee on the Economic Report: Automation may displace employment on a temporary basis, but *in the long run it's good for the economy* and in the American tradition of technological development. — *Industrial Research Newsletter.*

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Though primarily known as an industrial leader in developing electricity throughout the world, George Westinghouse received 38 patents on ways to convey, control, and distribute natural gas safely. He contributed 28 of these inventions in two years, after striking gas on his own estate. — *Westinghouse News.*

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Almost 70 per cent of National Guardsmen are between 17 and 21 years of age. Less than five per cent are over 35 years old. — *Information Section, Wisconsin Military District.*

# Industrial Arts and Vocational Education

*JOHN J. METZ, Editor*

## AIAA CONVENTION AT KANSAS CITY, MO.

THE nineteenth annual convention of the American Industrial Arts Association will be held on April 24, 25, and 26, 1957, in Kansas City, Mo. The American Council of Industrial Arts Teachers Education and the American Council of Industrial Arts Supervisors, both of which are affiliates of the AIAA, will hold their meetings on April 22 and 23.

The convention headquarters are located in the Hotel Muehlbach, and the registration and information center will be in the grand foyer of the Municipal Auditorium (13th Street entrance) from 8:30 a.m. to 6:00 p.m., Wednesday and Thursday. On Friday the registration hours are from 8:30 a.m. to 4:30 p.m.

As at previous conventions there will be numerous commercial exhibits of equipment, tools, materials, and technical textbooks, and reading matter.

Local and suburban junior and senior high schools will have student-made projects on exhibition; and on Friday, eleven teacher's colleges from Missouri, Illinois, Iowa, Oklahoma, Texas, and Wisconsin will have students present to give demonstrations of various kinds.

Trips to local schools and industrial establishments also have been arranged.

The first general meeting of the convention will be held at 2:00 p.m., on Wednesday afternoon. The president, Roy A. Radtke, will preside.

The convention theme that has been chosen is "Developments Affecting the Industrial-Arts Education Program."

Ivan Hostetler will be the chairman at this meeting, and Lindley J. Stiles, dean, School of Education, University of Wisconsin, will be the main speaker. His address will be "Developments Affecting Education in America."

At the Wednesday evening session, the chairman will be Marshall L. Schmitt, U. S. Office of Education. The main speaker will be John A. Fuzak, Michigan State College, and his subject is "Analysis of Developments to Determine Implications for Industrial Arts."

The chairmen of the six discussion groups that will follow the main address are: B. C. Tinnell, East Tennessee State College; Donald Lux, University of Illinois; Robert M. Worthington, Department of Education, St. Paul; Jack W. Morgan, Kansas State Teachers College; M. J. Ruley, Tulsa, Okla.; and Leo Ebben, Kohler, Wis.

At the 9:00 a.m. session Thursday, G. Harold Silvius, Wayne State University, will be chairman.

The speakers for this meeting are Ernest L. Minelli, Central Michigan College; Dewey F. Barich, Ford Motor Company; and Delmar W. Olson.

The five discussion groups will be under the guidance of Howard O. Reed, Iowa State Teachers College; Ralph C. Bohn, San Jose State College; J. V. Melton, Kansas State Teachers College; Howard F. Nelson, University of Minnesota; and Lowell L. Carver, Iowa State College.

The business meeting of the association will be held at 1:00 p.m. Thursday. Roy A. Radtke will preside.

The Thursday 2:00 p.m. session will be under the chairmanship of William J. Micheels, University of Minnesota. The theme of this session is "Learning and Behavior."

Robert D. Brown, Long Beach State College, and Gerhardt W. Neubauer, University of Florida, will be the speakers.

The leaders of the discussion groups will be Lowell Carver, Kenneth Phillips, San Diego State College, Robert L. Woodward, and Donald G. Lux.

The theme, "World Situation and Its Influence on Education," has been chosen for the Friday 9:00 a.m. session. Robert L. Thompson will be the chairman.

H. H. London will be the main speaker.

The leaders for the discussion groups are: Merton C. Wheeler, Missouri state department of education; Kenneth Dawson, Virginia Polytechnic Institute; Jack J. Faber, advertising sales manager, INDUSTRIAL ARTS AND VOCATIONAL EDUCATION magazine; Kenneth R. Benson, New York University; G. Wesley Ketcham, Hartford, Conn.; E. L. Barnhart, Kansas State Teachers College; J. Ely Van Hart, Elizabeth, N. J.; and Fred J. Schmidt, Jr., Ball State Teachers College.

The chairman of the 10:00 a.m. session on Friday will be Gordon Pallesen, assistant T & I supervisor for Virginia.

This meeting will be devoted to a special program of safety education, and the speaker will be Wayne P. Hughes.

The topic, "Should Driver Education Be Taught in the Industrial Arts Department?" will be discussed. E. J. Neary, safety director, Waukegan, will take the affirmative; and Robert Marshall, consultant, safety education, Kansas City, will assume the negative side of the question.

Student conducted programs with participants and demonstrators from eleven teacher education institutions will show what they have learned about electricity, graphic arts, shop planning, metalworking, plastics, drafting, chasing and repousee work, metal tooling, wrought iron work, photography and silk screen, electronics devices, air forming plastics, art metal, and leather.

Friday at 2:30 p.m., Kermit A. Seefeld will talk on "Evolving Concepts of the Role of the School."

The annual banquet will be omitted this year. Instead there will be a buffet supper at 6:30 p.m. This will be followed by the Ship's Program at 8:30 p.m., with Wesley Stephens of the McKnight & McKnight Publishing Co., deck officer.

## WHAT TO DO IN CASE OF FIRE

THE January, 1957, issue of "Facts and Trends," published by the National Board of Fire Underwriters in an article "How To Save Your Life," gives some extremely valuable advice that ought to be placed before our students and strongly impressed on their minds. It enumerates a number of rules, which, if more generally followed, would save lives.

The first of these says "Get everybody out of the house."

The second, *"Call the fire department."*

People who live in rural areas, or in small communities where residents and their neighbors have to fight their own fires, should have the following ready to hand.

1. Fire extinguishers. These should be accessible at all times, and they should be inspected at least once a year. Know how to operate the type you have, and do not wait for a fire to read the directions.

2. Have a water supply on hand. If there is no public water supply, a deep well or a pond is essential.

Water is absolutely necesary to fight fires.

3. Have one or more ladders, long enough to reach the upper story of the house, or even the roof so that when stairways are cut off by fire, those who are trapped under such conditions can be rescued.

4. A garden hose and buckets, and if possible a hand-operated pump tank, should be on hand.

# Time Capsule Fabricated in School

New Jersey educators joined with industry in the state in February, to promote a project of national prominence.

Built-In-Age, Inc., sponsor of the state's first Architect's Display Building, needed an organization to fabricate a copper time capsule.

The large vault would have to encase a wide variety of exhibits reflecting contemporary society. The entire time capsule will be buried for 100 years on the site of the showcase building in Mountainside, N. J.

After giving the matter complete discussion, Built-In-Age officials approached Harold Weideli, director of vocational education in Bergen County, N. J.

Mr. Weideli consulted with the faculty of the Bergen County Vocational High School in Hackensack and they decided upon a design and the means for fabricating the missile. Otto Schulze, an instructor in the uses of sheet metal, directed his group of teen-agers in the project. See this month's cover picture. The result was a copper time capsule about twice the size and shape of a football.

The time capsule was then loaded with exhibits and taken to the State House in Trenton where New Jersey Governor Robert B. Meyner officially sealed it in ceremonies broadcast over radio station WRCA (NBC flagship station in the greater New York area).

Attending the ceremonies was Dr. Fred Hipp of the New Jersey Educational Association. He commented favorably on the work produced by the students at the Hackensack school.

Charles S. Cohan, president of Built-In-Age, Inc., in addressing the group, declared on the occasion: "The unfavorable publicity given to our teenagers would have been forgotten if the nation could have viewed the creativity shown by our Bergen County young men. It is easy to draw stereotypes. It is a national shame that more people do not realize that the great majority of our youth are God-fearing, patriotic, young citizens. The real shame is that the nation views the mass of our youngsters by the actions of a rowdy handful."

Dr. Fred Hipp commented that the combination of local industry and the state educational system might do well to work together more often. By doing this, the N.J.E.A. said, industry could groom youth to guide its future in a more intelligent manner.

The Architects Display Building is a 33,000 square foot structure that will house complete displays of products used in all types of buildings — institutional, as well as industrial and residential. Exhibits featuring products used in construction and decoration of educational buildings will be shown to the general public, school boards, engineers, and architects.

Mr. Cohan adds that special conference rooms and a system of closed circuit television will also be made available for use of groups attending the Architects Display Building.

The structure is located on Route 22, Mountainside, N. J.

Built-In-Age, Inc., has offices at 744 Broad Street, Newark, N. J.

# Reproduction of Shop Drawings—Part I

**LAWRENCE S. WRIGHT**
Assistant Professor of Industrial Arts
Iowa State Teachers College
Cedar Falls, Iowa

It is now pretty well agreed that drawings are *the language of industry*. The interpretation of industry through school shop experiences has generally been accepted as one of the unique functions of industrial arts. No doubt we would agree that a serious effort is now being made in industrial-arts shops and drawing rooms throughout the country to develop skills and knowledge in the reading and making of drawings. Furthermore, industrial-arts teachers are attempting to emphasize the idea of the close relationship of drawing to the finished product of industry.

When we consider, however, the drawing itself practically never gets into the shop. An idea is born. See Figure 1. The engineer develops trial plans through sketches and drawings. An experimental model is made. In the light of this exploratory work, final drawings are prepared. These drawings are then reproduced by any one of several processes. It is the reproduced copies of the drawings that finally arrive in the shop, while the originals are carefully stored away.

There are several basic processes

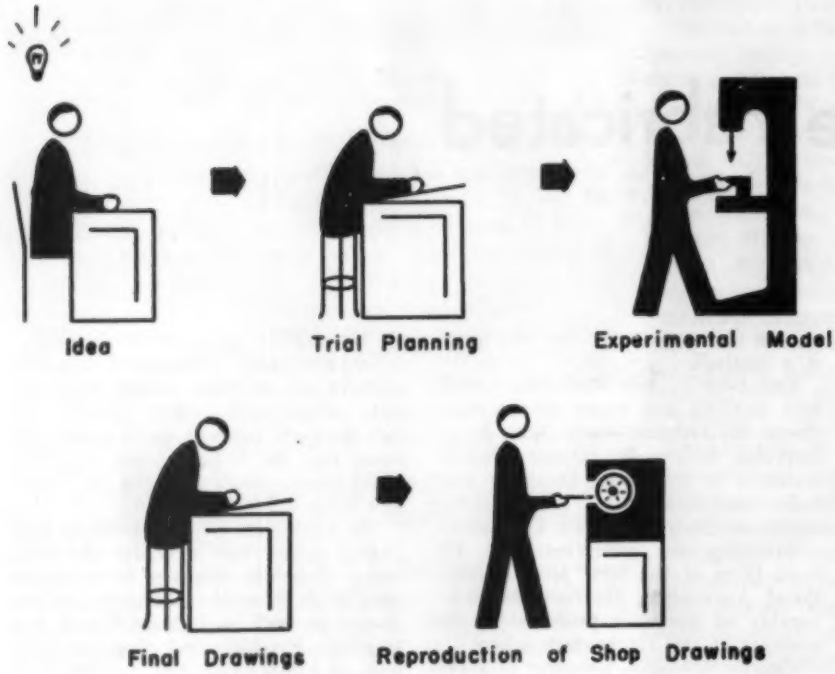



Fig. 1 Developing Shop Drawings

commonly used by industry in reproducing shop drawings. These include the dry diazo process, the moist diazo process, the blueprint process, the Vandyke process, and the photographic process. While the resultant prints of the photographic process are the most durable, the cost of materials is relatively high and the nature of the sensitized materials requires the use of a darkroom. Discussion of the photographic process, therefore, will not be a part of this series.

According to Webster, "diazo" (dī-ăz′ō) is a "combining form denoting the presence of a group of two nitrogen atoms, $N_2$, in direct union with one hydrocarbon radical and, usually, with some other group or atom." It has been found that papers that are coated with light-sensitive diazo compounds together with an azo dyestuff component, have the latent ability to form a colored dye. When ammonia vapors come in contact with the diazo compound and the azo dyestuff, the coating on the paper is transformed into a colored dye. Exposure to ultraviolet light will decompose the sensitized coating causing it to lose its ability to form a colored dye.

The process of dry diazo printing itself is quite simple, a feature which makes the process very attractive to industry. It is a process which yields a positive line reproduction from a positive line original. See Figure 2. The light-sensitive paper is placed with the sensitized side up. The positive line original on translucent or transparent paper is placed face up on top of the sensitized paper. These two papers in contact with each other are then exposed to an ultraviolet light source such as that in any commercial printing machine or that from a natural source such as the sun. Ultraviolet light decomposes the light-sensitive coating everywhere that the paper is not protected from the light by the lines of the original. Developing the print is accomplished by placing the sensitized paper in ammonia vapors. These vapors cause the azo dyestuff component and the diazo compound to combine. A colored dye results on all surfaces that have been protected, thus giving a positive type reproduction from the original.

Fig. 2 Dry Diazo Process

Fig. 3 Moist Diazo Process

Exposing the sensitized paper takes place in the same way in both processes. The positive line original is placed face up over the light-sensitized paper. While in contact with each other an ultraviolet light source will cause decomposition

### Moist Diazo Process

The moist diazo process is similar to the dry diazo process in that the same type of chemical reaction takes place to produce the image lines on the reproductions. In each of the diazo processes a diazo compound is combined with an azo dyestuff to produce the colored dye on the reproduction. The basic difference lies in the location of the dyestuffs. In the dry process as has been pointed out earlier, the dyestuffs are a part of the sensitized surface of the paper. In the moist diazo process the dyestuffs are a part of the liquid developing solution.

of the sensitized material on the print paper where it is not protected from this light source by the lines on the original. The procedure for developing a moist diazo print is somewhat different than that used in the development of dry diazo prints. See Figure 3. The developing salts come in two separate containers. They must be mixed with water according to the manufacturer's directions. After exposure to light, the sensitized paper is fed through the developing rolls of a machine. The reason this process is called a moist or semi-moist process is simply that while a liquid developer is used, the prints dry almost instantly — especially when the developing unit has a heater type roll. Moist diazo prints may also be developed by sponging the sensitized side of the print paper with the liquid developer or by dipping the exposed print directly into a tray of developing solution. If this method is followed, after dipping the print directly into the developing solution, it is desirable to rinse it in clear water and then to dry it thoroughly. Drying will prevent the print from discoloring and will reduce image line fading.

## *Problems and Projects*

# Project Design for Shop Teachers

**ALEXANDER F. BICK**
**Teacher in Milwaukee Schools**
**The Milwaukee Downer College**
**Milwaukee, Wis.**

Many industrial-arts teachers are sensitive to the fact that their project designs lack the authority and appeal of professional work. There are years of training back of professional designs and designers. Industrial-arts teachers are not professionally trained in that area: and yet they are expected to teach professional design. It is regrettable that they are not trained, as are designers and architects.

The designers in the categories just mentioned are also practical men by necessity, and they have firm grounding in mechanics, engineering, and building construction as well as industrial methods, and new materials. A member of either one of these professions would make an outstanding industrial-arts teacher if they attended a few summer school sessions to acquire the professional training that is required for teaching. Teachers who lack the professional design training are not adequately fitted to teach industrial-arts design.

Our teacher education schools do not employ professional industrial designers of authority and their courses are not built on objectives in any way comparable to those of, let us say, an architectural training school. And yet, why should they not be? What is there in our great professional schools that we in industrial arts do not want? We need the kernel of that which is basically present in those schools, a wider outlook.

This is not a criticism of the personnel of our teacher education schools nor is it meant to be a criticism of a single school. The men in our teacher-education colleges are earnest and sincere. They are as carefully picked and as grounded in their subject as the faculty in any other field of education.

Design is visible before any other quality in industrial-arts projects, and it magnifies or degrades all other qualities back or under it. If the teacher, with or without professional training, brushes aside its relative pre-eminence, as a haircut might be brushed aside by a well-dressed man, he might not make his point very convincing. In fact, all of his good might be overlooked because of his conspicuous deficiency. With apologies for this analogy the point is: an industrial-arts product, or a car, or a hat, deserves only ridicule when fine material and workmanship is degraded

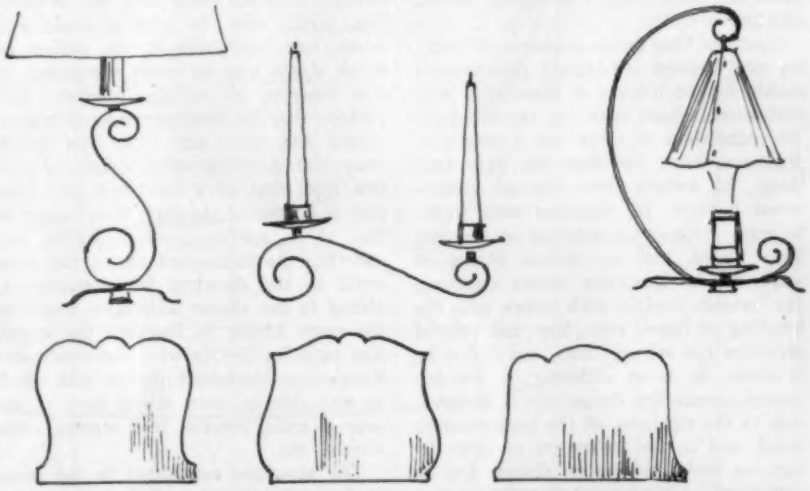


Fig. 2. The use of scrolls in metalwork. Lower line shows poor use of scrolls in bookend design

Fig. 1. The use of scrolls in furniture design

by its out-of-date dress. We know this in the commercial world. A businessman knows better than to tolerate obsolete design. His bank balance soon teaches him discretion. A large part of the general public demands design of the latest trend. If the businessman were asked by industrial-arts leadership, his instant decision for industrial-arts project design would leave no room for question as to its needed affiliation with the advance in the contemporary design trend.

As it is today the industrial-arts department as a whole operates in a cloud of indecision, and confusion hovers over the area of industrial-arts project design. This is a natural outcome of not only the lack of the right type of professional training, but of the narrow outlook under which the department is struggling toward who knows what?

Teachers who desire professional training may become self-trained professionals merely by the process of association with professionals, and since the teacher lacks the connections to make this a person to person contact, he does the next best thing; he follows them through professional journals. He examines their work; he reads professional comment on the very latest trend, and on various phases of work, and on particular artist's creations. He becomes familiar with names, with the handling of bases, arms, legs, and tops of furniture and storage cases, and before he is aware, he is an authority on contemporary commodity design. He is as sensitive to the rightness of the contemporary trend, and to the wrongness of poor design, as any authority on design; but he will build up his know-how only by continuous association and if he is after real mastery, he must sketch as he reads. No one really learns until he creatively builds that which he studies.

An example of the misuse of the design symbols of past periods through lack of professional training is to be seen in the much abused scroll forms of the Italian Renaissance. A professional, knowing their history and their Spanish, French, and English interpretation, need not make these mistakes.

The basic scroll is derived from the Greek, and by them perhaps from earlier Persian. It abounds in Greek vase painting and sculpture along with anthemion in friezes and antefixes. The Renaissance, being the re-birth of the classical arts, played much with this form, as was their right. It was adapted to metal and wood turnings such as lamp stands, candleholders, table and chair parts, etc. In turnings, scrolls took the form of husks and necks, cups, and balls, in the outline of which scrolls may be easily recognized. It was however in corbels, brackets, and consoles that the Renaissance scroll is most typical and often met with. The sketch traces the use of the scroll corbel and console from that of a functional post support in a table of the early Renaissance to that of its nonfunctional decorative use, and then the flamboyant use of the same scroll in the decadent late Renaissance, ending in the simple adaptation found in the early 1700's in England, the Queen Ann table leg. Scrolls were also convenient Renaissance blacksmith devices with which he was able to cover spaces such as appear in grills, reredos, rood screens, choir screens, etc.

The atrocities committed in the name of design by those who lack design understanding are often as logical as a suit of armor or a velvet jacket and hat with ostrich plumes. Figure 2 shows a few of these unfortunate industrial-arts products both in iron and in wood. Anyone who knows about the origin of Renaissance forms could not be guilty of the ugly bookend contours shown.

The remedy, of course, is knowing, and wanting to know.

## PSEUDO-EBONY LAMP BASE

**RICHARD M. BIRCH**
Mechanicsburg, Pa.

This contemporary styled lamp base has been an interest getter in my industrial-arts woodworking classes. Not only the unique way of cutting out the base but also the unusual method of finishing it has made this a popular project.

### Bill of Material

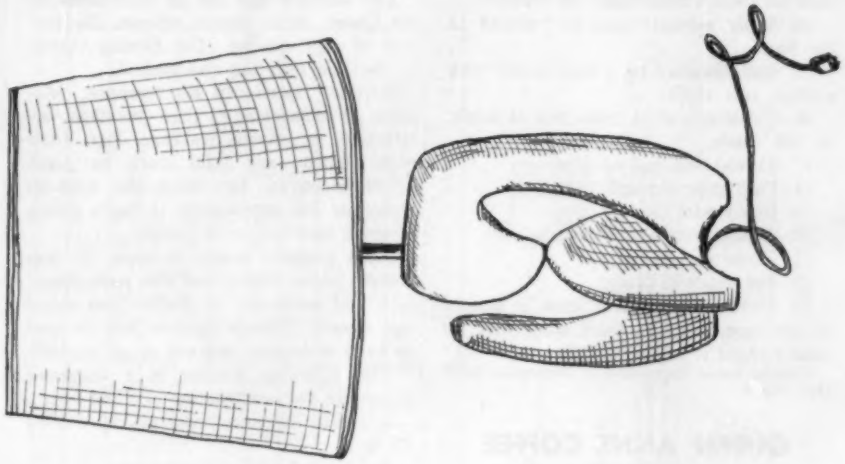
One piece of mahogany 1½ by 11 by 12 in.; one piece of ⅛-in. brass pipe, 16 in. long; waterproof glue; electrical accessories (wire, plug, socket, socket harp); suitable lamp shade beeswax.

### Tools and Equipment

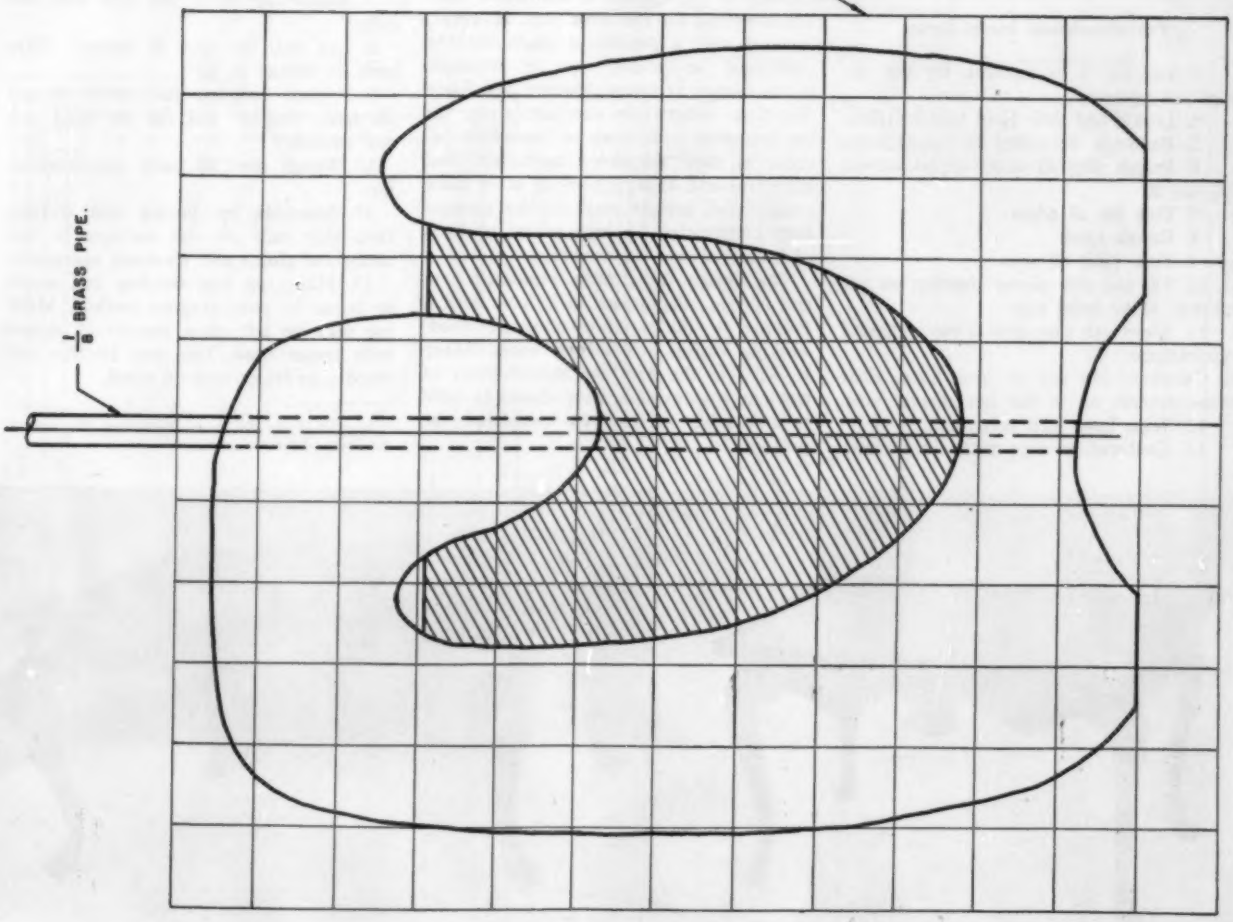
Ruler, pencil, try square, crosscut and ripsaws, jack plane, French curve, brace, ⅜-in. drill, band saw, assorted rasps and files, assorted garnet paper, blowtorch, soft cotton cloth, hack saw, ⅜ electrical pipe die and wrench, wood mallet, screw driver.

### Procedure

1. Select, measure, and cut a clear piece of Philippine mahogany 1½ by 11 by 12 in.
2. Square stock.



PSEUDO-EBONY LAMP BASE




Details of the pseudo-ebony lamp base

Pseudo-ebony lamp base

3. Lay out 1 in. squares, lay out design on squares.
4. Locate and drill ⅜-in hole in stock.
5. Band-saw according to layout lines.
6. Rough rasp all edges approximately ¾ in. R.
7. Fine file all edges.
8. Rough sand.
9. Fine sand all over.
10. Fit and glue pieces together as per sketch. Make holes align.
11. Blowtorch base until it has a charred appearance.

CAUTION: Do not let base burn. Char base outside or in the hot metals area.

12. Wipe base with soft cloth.
13. Continue to wipe with clean cloths until no more carbon soils the cloths.
14. Apply several coats of beeswax to the base.
15. Buff beeswax to a high luster with a clean soft cloth.
16. Cut length of ⅛ brass pipe at height to suit shade.
17. Thread one end of pipe.
18. Push pipe through base.
19. Insert wire through pipe.
20. Attach plug and socket to wire.
21. Screw socket to pipe.
22. Put shade in place.
23. NOTE: If a natural finish is desired on the base, any 1½ thick stock may be used without it being charred.

Photo by Robert Hare, senior at Cumberland Valley High School.

## QUEEN ANNE COFFEE TABLES

**ROLAND BACON**
**Head, Department of Industrial Arts**
**George Washington High School**
**Danville, Va.**

Contemporary and modern furniture styles are becoming more and more popular, and in the opinion of the writer they are deserving for the most part. However, there is still a prominent place for the traditional or period type of furniture in our homes of today. Modern and Early American designs are excellent styles for the beginning craftsman to reproduce because of their simplicity, usefulness, and attractiveness. Modifications of other more complicated designs may also be successfully constructed by high school students of industrial-arts woodworking.

The Queen Anne table presented here and certain adaptations of it have been a favorite of the writer's advanced woodworking classes for several years. Many students in the first and second years of machine woodworking have chosen to build it and have successfully completed the project.

The cabriole legs are an adaptation of the Queen Anne design without the pad foot or any carving. The flowing curves of the side rails are also typical.

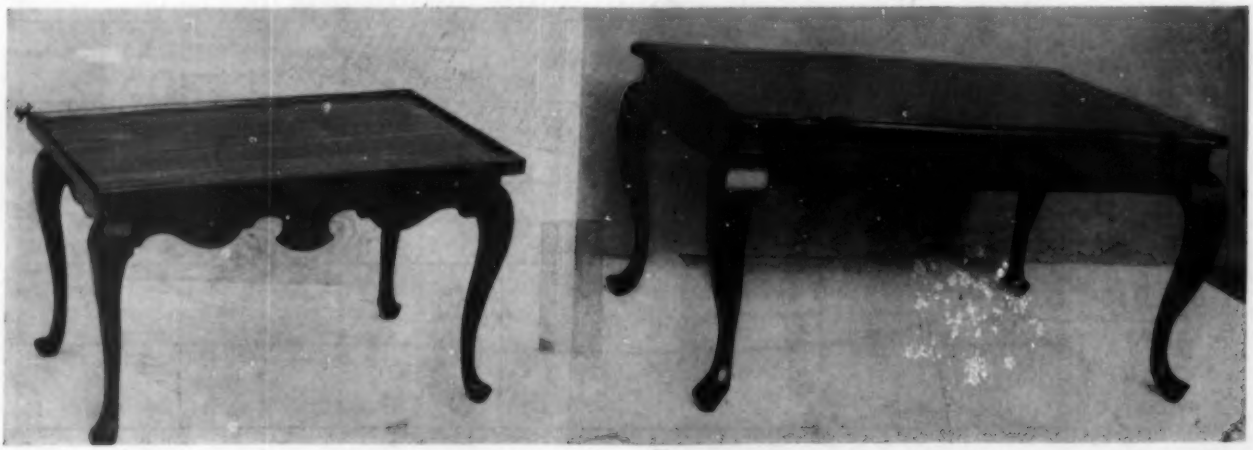
Herman Hjorth, in his textbook, *Machine Woodworking*,* gives excellent instruction in sawing cabriole legs from both built-up and solid stock on pages 93–94 inclusive. By using the built-up technique the opportunity to teach gluing of stock face to face is present.

Some students prefer to leave the legs square while others use the spokeshave, files, and sandpaper to model them round and smooth. Outside calipers may be used to keep diameters uniform at all sections.

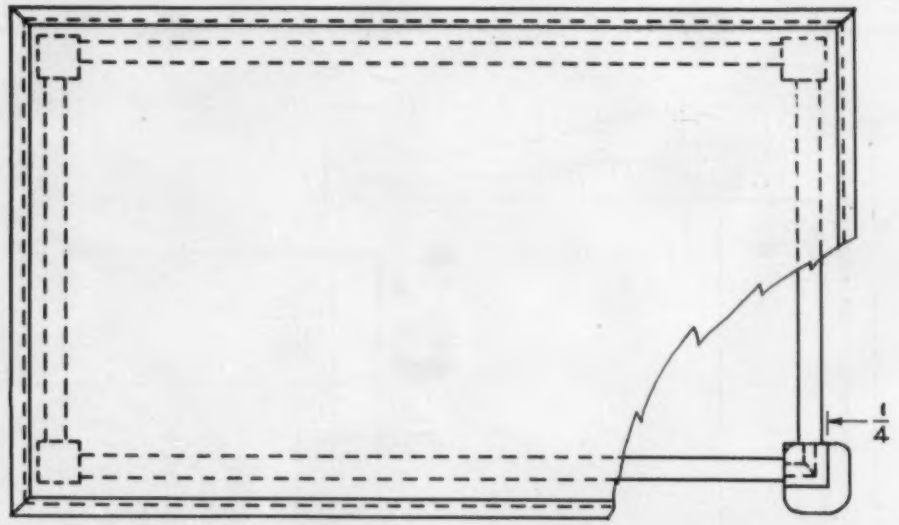
The following outline is a suggested procedure for construction of table No. 1.

1. Square up four posts 1½ by 1½ by 17 in.
2. Lay out and cut mortises.
3. Glue strips *A* and foot blocks *C* in place.
4. Glue strips *B* and foot blocks *D* in place overlapping *A* and *C* respectively. (Be sure glued joints fit well.)
5. Lay out design for legs and cut as per instructions: *Machine Woodworking*, Hjorth, pp. 93–94.
6. Smooth and model legs.
7. Square up stock for side and end rails.
8. Lay out, cut, and fit tenons. Miter ends of tenons at 45°.
9. Prepare template for curved designs on rails, transfer and cut on band saw and smooth.
10. Rough sand all parts completed so far.
11. Assemble by joining end sections then side rails to end sections in two successive gluing and clamping operations.
12. Make top and molding and attach to frame by your favorite method. Molding may be left plain instead of shaped with center bead. Top may be thin plywood over frame or solid wood.

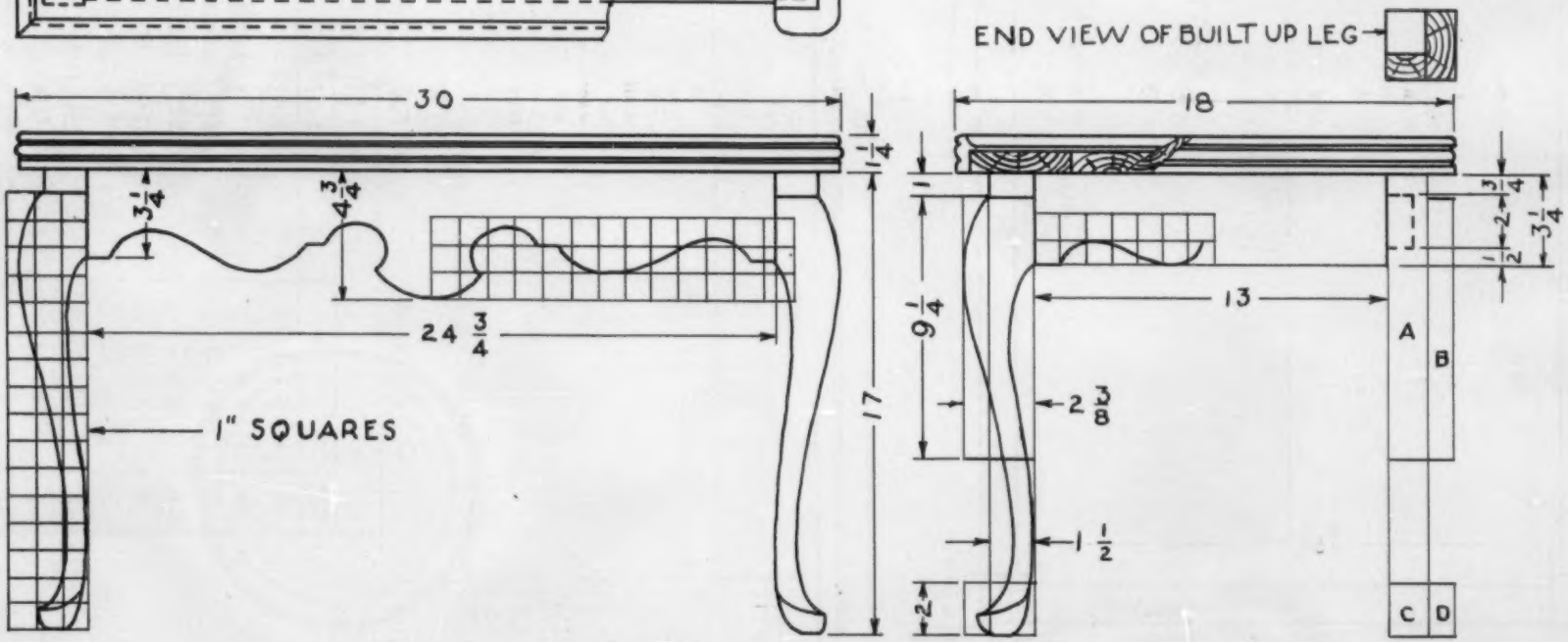
*Published by the Bruce Publishing Co., 400 N. Broadway, Milwaukee, Wis.



Queen Anne coffee tables Nos. 1. and 2



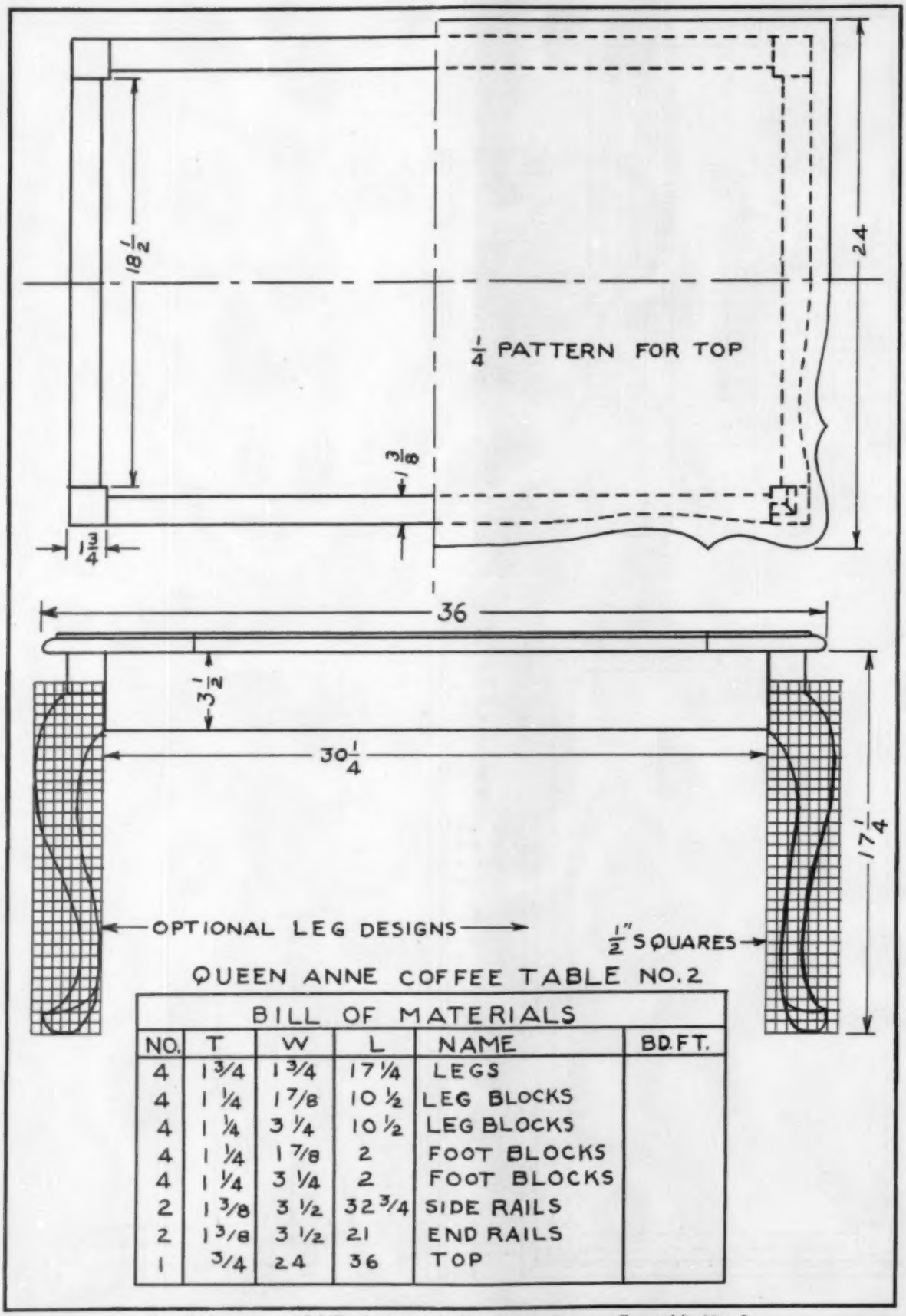

| MATERIAL BILL | | | | |
|---|---|---|---|---|
| NO. PCS. | T | W | L | NAME |
| 4 | 1½ | 1½ | 17 | POSTS |
| 4 | ⅞ | 1¾ | 9¼ | STRIPS-A |
| 4 | ⅞ | 2½ | 9¼ | STRIPS-B |
| 4 | ⅞ | 1¾ | 2 | FOOT BLOCKS-C |
| 2 | ¾ | 4¾ | 26¾ | SIDE RAILS |
| 2 | ¾ | 3¼ | 15 | END RAILS |
| 1 | ¾ | 17 | 29 | TOP |
| 4 | ⅞ | 2½ | 2 | FOOT BLOCKS-D |
| 2 | 5/8 | 1¼ | 32 | MOLDING-SIDES |
| 2 | 5/8 | 1¼ | 20 | MOLDING-ENDS |




QUEEN ANNE COFFEE TABLE NO. 1

BY ROLAND BACON HEAD, DEPT. OF INDUSTRIAL ARTS, DANVILLE, VIRGINIA

**Detail drawing and bill of materials for Queen Anne coffee table No. 1**




QUEEN ANNE COFFEE TABLE NO. 2

BILL OF MATERIALS

| NO. | T | W | L | NAME | BD. FT. |
|---|---|---|---|---|---|
| 4 | 1 3/4 | 1 3/4 | 17 1/4 | LEGS | |
| 4 | 1 1/4 | 1 7/8 | 10 1/2 | LEG BLOCKS | |
| 4 | 1 1/4 | 3 1/4 | 10 1/2 | LEG BLOCKS | |
| 4 | 1 1/4 | 1 7/8 | 2 | FOOT BLOCKS | |
| 4 | 1 1/4 | 3 1/4 | 2 | FOOT BLOCKS | |
| 2 | 1 3/8 | 3 1/2 | 32 3/4 | SIDE RAILS | |
| 2 | 1 3/8 | 3 1/2 | 21 | END RAILS | |
| 1 | 3/4 | 24 | 36 | TOP | |

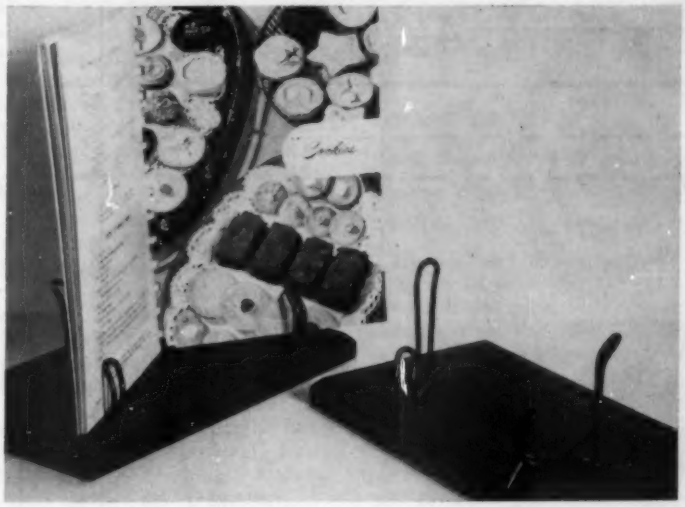
Detail drawing and bill of materials for Queen Anne coffee table No. 2

13. Do final sanding and apply the finish.

### Queen Anne Coffee Table No. 2

This is another variation of the Queen Anne design. It is different from the first one in several respects. Instead of the typical curved apron the rails have a serpentine design which echoes the curved edges of the top. The table is more massive in size and is more adaptable to the larger sized living room. Details of construction are almost identical with the first design submitted.

A first prize in the ninth and tenth woodworking division of the state sponsored industrial arts exhibit was awarded a tenth-grade boy for his construction of this project.



The cookbook holder in use

## COOKBOOK HOLDER

**ATHOL R. BAILY**

Associate Professor of Industrial Education

University of Washington College of Education

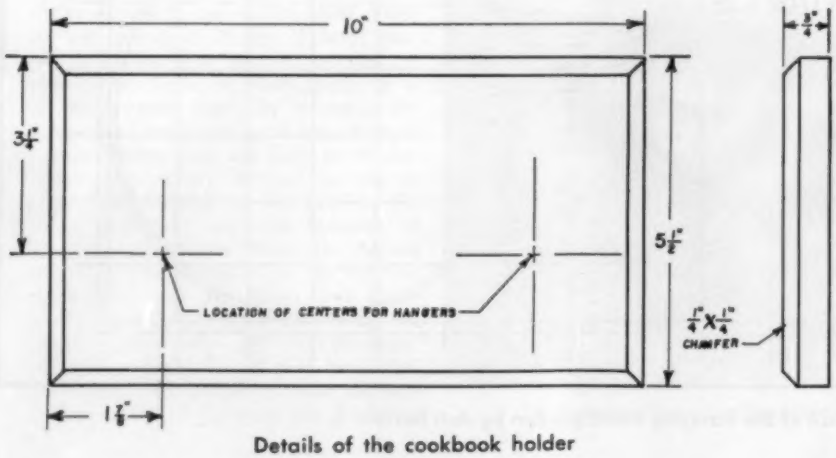
Seattle, Wash.

At the beginning of the school term, the shop teacher tries to find a desirable project which will get the beginning classes under headway, challenge the ability of the students, interest the students, have low cost, and have considerable utilitarian value.

The cookbook holder, illustrated herein, makes a very desirable project for beginning boys in the woodworking classes or general shop, woodworking area. It embodies the basic principles of reading a drawing, making a bill of material, squaring up stock, laying out and cutting a chamfer, measuring with a rule, and wood finishing. It is large enough that the students have very little difficulty in working with the material, yet quite inexpensive with considerable boy interest and provides basic experiences in beginning woodwork. The project not only may be used as a cookbook holder in the home, but may be used for displaying books. It may be made of any kind of wood.

### Steps of Procedure

1. Read the drawing and make out bill of material.
2. Get out stock, check for size and record on stock record card.
3. Plane working face true and mark it.
4. Plane working edge straight and square with working face and mark it.
5. Have work checked by instructor.
6. Square one end to working face and edge.
7. Have work checked by instructor.
8. Measure to length and square second end.
9. Gauge to width and plane to line.
10. Gauge to thickness and plane to line.
11. Check your workmanship.
12. Lay out and mark centers for hangers.
13. Lay out chamfers.
14. Plane chamfers.
15. Drill pilot holes and screw hangers in place.
16. Remove hangers.
17. Sand all surfaces.
18. Apply suitable finish.
19. Figure actual time and cost and record.
20. Turn in to instructor for evaluation.




Details of the cookbook holder

## HANGING FLORAL GARDEN

**ASH BARTO**

General Metal Shop

High School

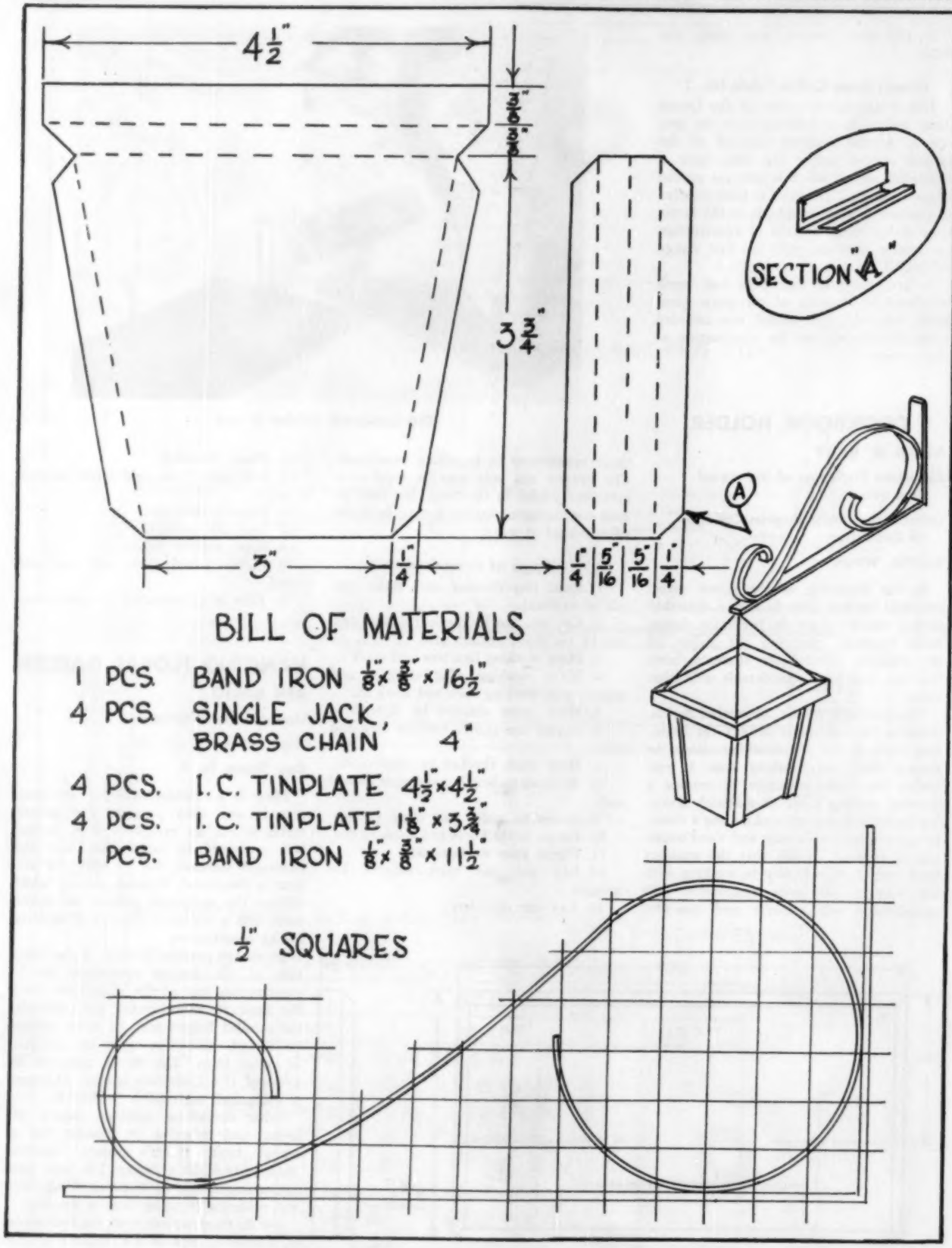
Bay Shore, N. Y.

There is a constant need for new projects in any shop program and general metal is not an exception. This project was conceived to satisfy not only this particular demand, but to offer the student a functional, finished project which utilizes the maximum number of operations with a minimum amount of material for its construction.

Its design permits latitude in the selection of the various operations for its construction, but at the same time keeps the basic structure intact. For example: the scrolled hanger may be either riveted or brazed, depending upon the facilities of your shop. The floral pot can be soldered, if I C tinplate is used, or brazed if galvanized material is preferred.

Other operations involved consist of: layout and enlarging by squares, use of layout tools, tinner's shears, squaring shears, bar folder or brake. The basic hand operations include hack-sawing, filing, drilling, soldering, riveting, and/or brazing.

For its construction: first, cut four pieces of galvanized iron or I C tinplate 4½ in. square. These pieces, as the print indicates, are the sides or body of the hanging pot.




Detail of the hanging floral garden by Ash Barto

The drive seams are cut in the flat layout to a dimension of 3¾ in. by 1⅛ in. After the necessary cutting and bend lines are laid out on all the pieces, they can be cut to their finished dimension with the tinner's shears.

The bending operation can be accomplished by using the bar folder, bench brake, or even the vise; however, it is recommended that the seams be folded on each side first, then the ⅜-in. reinforcing edge across the top can be formed without any difficulty.

The drive seam members, 3¾ by 1⅛ in. may be formed next. If attention is given to the sectional illustration little trouble will be experienced in their actual formation.

The bottom consists merely of cutting a piece square to a dimension of 4 in., which allows for a ¼-in. flange on all four sides. The corners are then cut to 45-deg. angles and the edges are formed up to 90 deg. on all four sides. These ¼-in. flanges will enable the bottom to be sweat-soldered or riveted in place for final assembly.

After all pieces of the floral pot have been formed, any two of the sides are held, seams together, at a 90-deg. angle with the ⅜-in. reinforced edge resting on the bench top. Next, take one of the folded drive seams and slide it into position over the two seams running down the sides of the pot. Using a rawhide mallet, tap gently until the drive seam section has been driven down the sides and fits snugly under the folded reinforced edge of the top. Repeat this process until all four corners of the pot are locked and seamed together. Turn the assembly over at this time and insert the bottom, flanges facing down, press into position until bottom's edge is aligned with the side's bottom edge.

Prepare pot for soldering, clean all joints and seams, flux and apply solder. Rings for holding the chain can be formed around ¼- or ⅜-in. round stock out of $\frac{3}{32}$ welding rod or wire of comparable diameter, cut and held in position with pliers while top corners of the pot are being soldered.

The scrolled hanger is then made. First, cut two pieces of ⅛ by ⅜ band iron, one to a dimension of 16¾ in. and the other 12 in. Take the short piece, fit it to the template made by enlarging the squares and locate the bend line, place in vise or bending fork and form to 90 deg. The scrolled section, 16¾ in., can then be started by forming in the bending jig. Check each bend with the template to insure proper contour. When the desired shape has been obtained line up the two pieces, and mark for ⅛-in. rivet holes. Then drill and rivet. If brazing is desired clamp securely into position and braze. Holes for hanging should then be drilled and a ring hook similar to those soldered on the corners of the floral pot should be located at the extreme edge of hanger to receive chain.

For finishing, use black crackled radio chassis paint on the pot, and gloss enamel for contrast on the scrolled hanger, or the entire unit can be painted flat black thus depending upon the brass chain and green leaf plant for contrast and effect. When paint is dry, cut four pieces of single jack brass chain 4 in. long, fasten one end on each ring of the four corners and the other ends are drawn together and secured on the scrolled hanger hook. Slight pressure with the pliers will close the rings locking the chains into place. Fill pot with philadendron or ivy and hang on the wall in a suitable position.

Without asphalt the roofing industry would be almost nonexistent today. Nearly 90 per cent of modern roofs are made with asphalt, an oil product.

## CONTEMPORARY COFFEE TABLES WITH MAGAZINE SPACE

**ROLAND BACON**

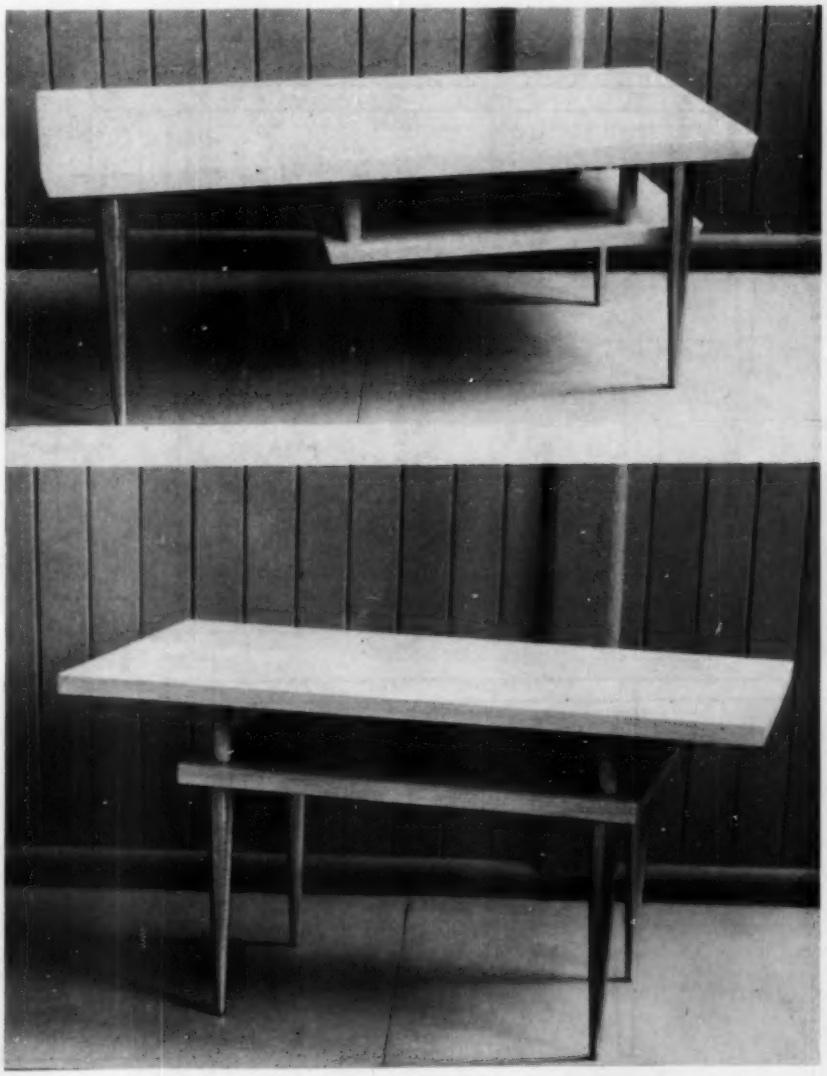
**Head, Department of Industrial Arts**

**George Washington High School**

**Danville, Va.**

The modern coffee tables shown here make use of more than one kind of material and also serve a dual function, providing a space for current magazines as well as ample top space.

The construction is simple enough to enable the average ninth or tenth grade pupil to produce a successful product. Several variations of them have been completed in the writer's woodworking classes with good results.



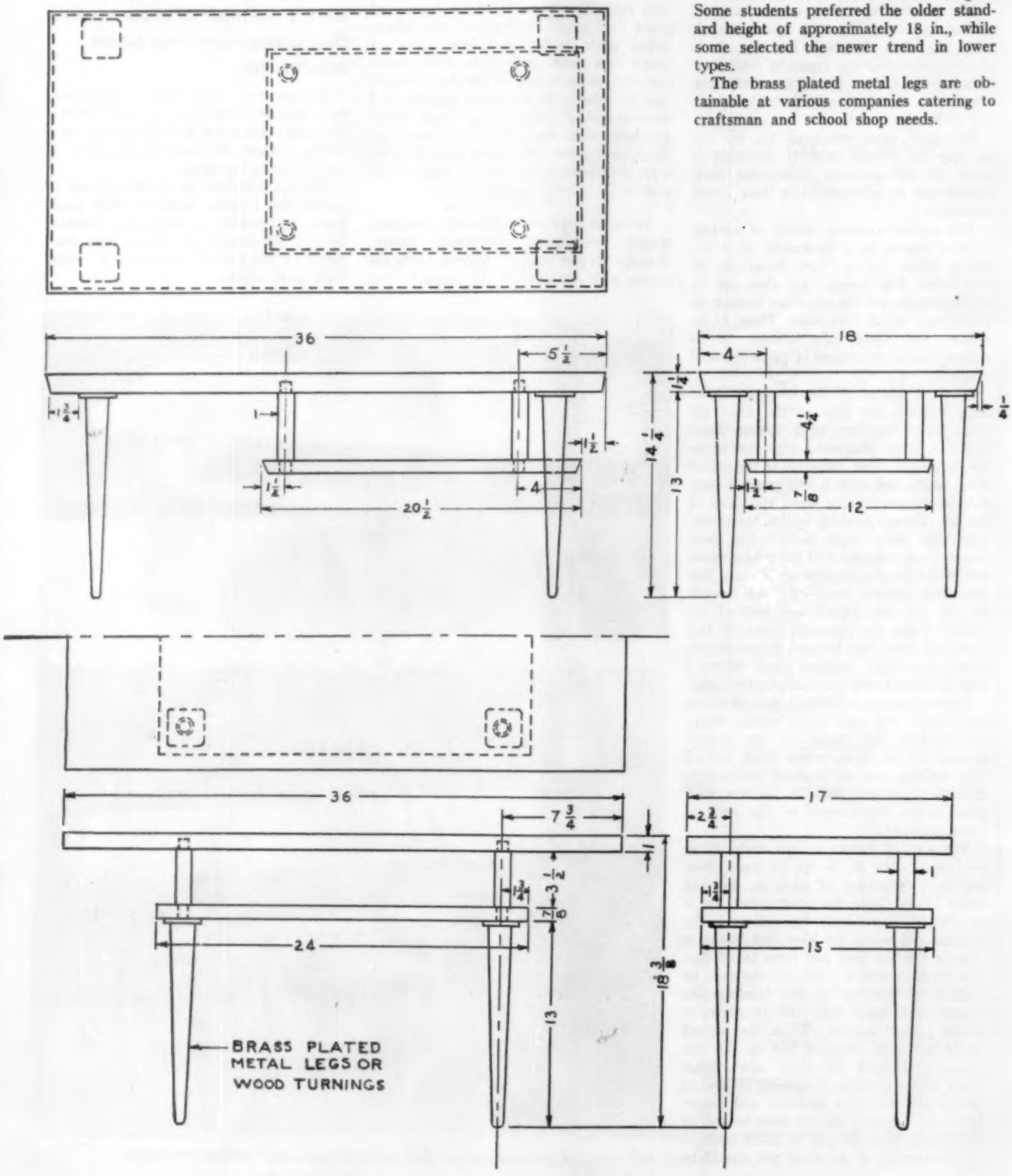
Contemporary coffee table designs with magazine space

We found that the best way to obtain perfect alignment of the holes for the wooden dowels was to lay out the centers on the bottom of the shelf, then clamp the shelf and top together in proper position and drill the holes in both pieces simultaneously on the drill press. The depth gauge should be adjusted so that the drill will not come through the top.

These tables were made of solid red oak. They were given a blond finish by applying white "Firzite" followed by three coats of "Satinlac" each of which was rubbed down with fine steel wool. A wax polish was applied as the final step in finishing.

The tables were made in two heights. Some students preferred the older standard height of approximately 18 in., while some selected the newer trend in lower types.

The brass plated metal legs are obtainable at various companies catering to craftsman and school shop needs.




Detail drawing of the contemporary coffee tables with magazine space

# COST REDUCTION CHARTS

BY RICHARD E. SHAFER,
PROFESSIONAL CONSULTANTS, INC., PASADENA

INCREASED COMPLEXITIES AND INTER-RELATIONSHIPS OF BUSINESS AND INDUSTRIAL OPERATIONS HAVE ADDED EMPHASIS TO THE IMPORTANCE OF FORMALIZING PROCEDURES AND IN KEEPING THE PROCEDURES UP-TO-DATE. THE FORMATION OF A PROCEDURE USUALLY OCCURS IN ONE OR MORE OF SEVERAL WAYS WHICH MAY INCLUDE:

1. ROUTINE OR CUSTOMARY METHODS GRADUALLY EVOLVE INTO A PROCEDURE, 2. METHODS ADAPTED FROM OTHER CONCERNS, 3. ANALYSIS AND PLANNING BEFORE OR AFTER OPERATIONS COMMENCE, 4. BOOKS OR ARTICLES, 5. CONSULTANTS OR FIRMS DEALING IN BUSINESS FORMS

PARTICULARLY DURING PERIODS OF INCREASE OR DECLINE IN SIZE OF AN ORGANIZATION OR DURING PRODUCT DIVERSIFICATION VARIOUS PROCEDURES AND OPERATIONS MAY BECOME SOMEWHAT OBSCURED. DUPLICATIONS OR OMISSIONS MAY RESULT.

FREQUENTLY TO BRING IMPORTANT FACTORS INTO FOCUS, VARIOUS TYPES OF CHARTS ARE HELPFUL. GENERALLY, OMISSIONS AND DUPLICATIONS IN OPERATIONS WILL BE REVEALED AND COORDINATION IMPROVED. IN ADDITION, THE CHARTS AID IN ASSIMILATION OF PROCEDURES, AS WELL AS IN CORRECTION OF BOTTLENECKS.

THE ILLUSTRATIONS ARE SELF EXPLANATORY. VARIOUS OTHER FACTORS SUCH AS DISTANCE OR TIME BETWEEN OPERATIONS ON FORMS OR PARTS MAY BE ADDED READILY.

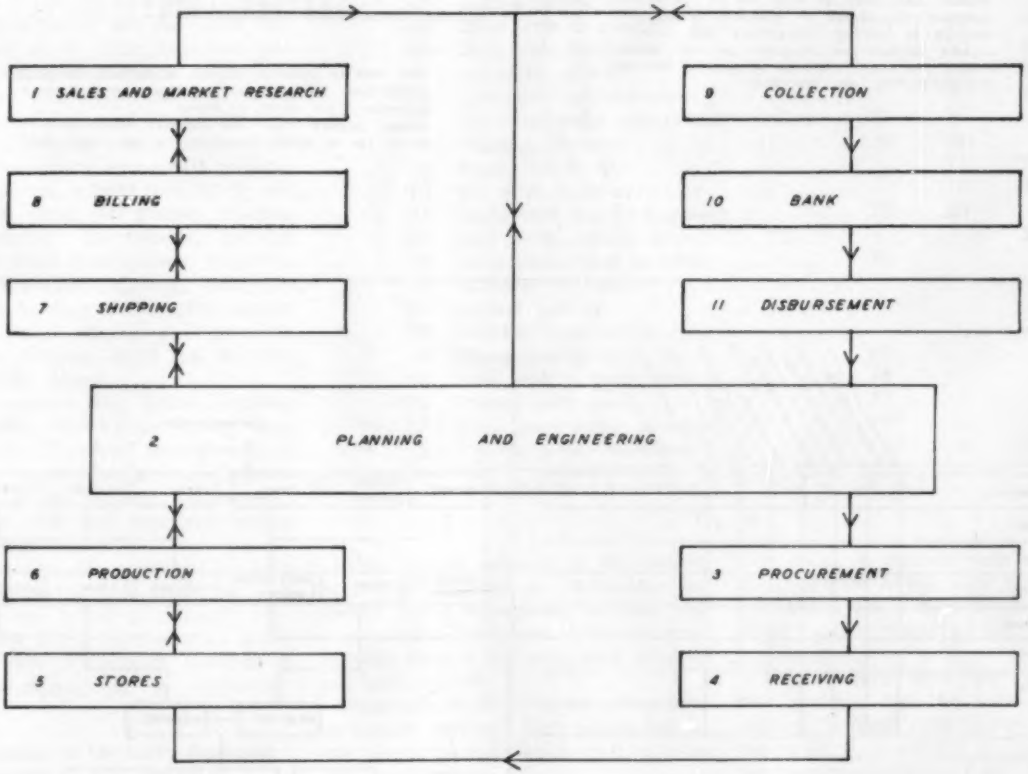



FIG. 1

INTER-RELATIONSHIPS OF MAJOR ACTIVITIES. THE ARROWS SHOW GENERAL FLOWS AND INTER-DEPENDENCE. THE NUMBERS SHOW GENERAL SEQUENCE IN THE COURSE OF OPERATIONS. THE WELL-KNOWN GANTT-TYPE CHARTS ARE PREPARED FOR DETAILED SCHEDULING OF ENGINEERING OR OTHER OPERATIONS AFTER ANALYSIS AS INDICATED.

Cost Reduction Charts designed by Richard E. Shafer, assistant to the president, Professional Consultants, Inc., Pasadena, Calif.

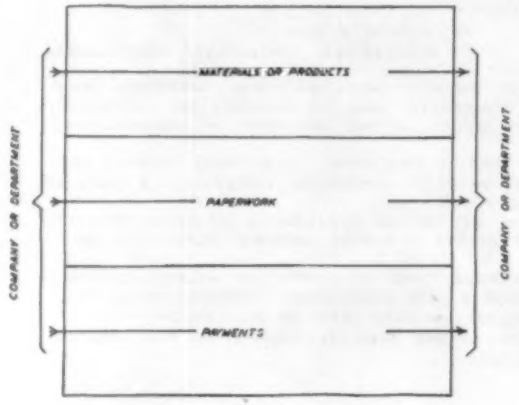



FIG. 2

SIMPLIFIED SCHEMATIC OF DEPARTMENTAL OPERATIONS SHOWING OBJECTIVES OF REDUCTION OF COMPLEXITY. ALTHOUGH THIS DEGREE OF SIMPLICITY IS RARELY ACHIEVED IN PRACTICE, OBJECTIVES ARE MORE CLEARLY DEFINED AND VISUALIZED BY THIS INITIAL STAGE. THE NEXT STEP IS A DIAGRAM DEFINING RESPONSIBILITIES AND FUNCTIONS.

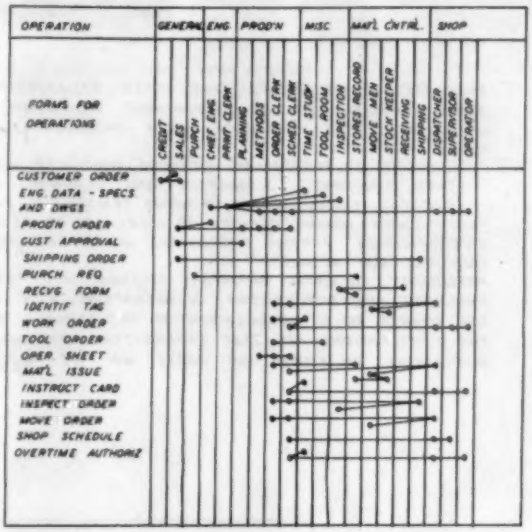



FIG 3

THIS TYPE OF CHART IS HELPFUL IN COMPACT ANALYSIS OF OPERATIONS SUCH AS FLOW OF FORMS OR PRODUCTION ●= ORIGIN ○= ROUTE OF FORMS. WHERE DESIRED TIME AND DISTANCES MOVED BETWEEN POINTS CAN BE NOTED ADJACENT TO THE FLOW LINES.

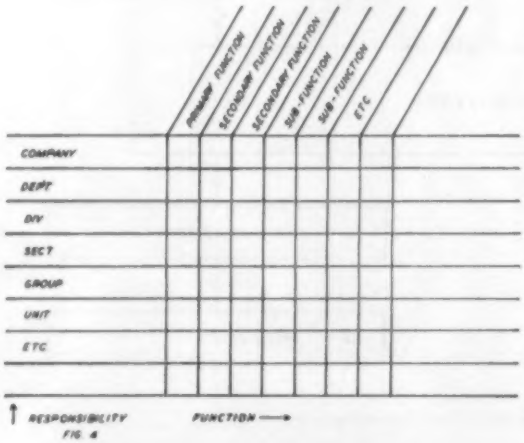



FIG. 4

A TYPE OF CHART PARTICULARLY USEFUL IN DEFINING SCOPE OF RESPONSIBILITIES AND FUNCTIONS AND IN LOCATING DUPLICATIONS AND OMISSIONS. A MARK IS MADE IN THE APPROPRIATE COLUMNS. EITHER COMPANY OR DEPARTMENTAL ACTIVITIES CAN BE ANALYZED. THE CHART IS ALSO OF VALUE IN ANALYZING COMMON PARTS OR SUB-ASSEMBLIES OF PRODUCTS FOR INTERCHANGEABILITY TO AID IN REDUCING COSTS, SIMPLIFYING FLOWS AND IN REDUCING INVENTORY REQUIREMENTS. FOLLOWING THIS, FLOW DIAGRAMS SIMILAR TO FIG. 2 OR 3 ARE MADE WITH MINIMUM PRACTICAL COUNTER-FLOW AND CROSS-FLOW WITH CONSIDERATION FOR PRODUCTS, STOCK, SCHEDULES, OPERATIONS, SUB-ASSEMBLIES AND FACILITIES.

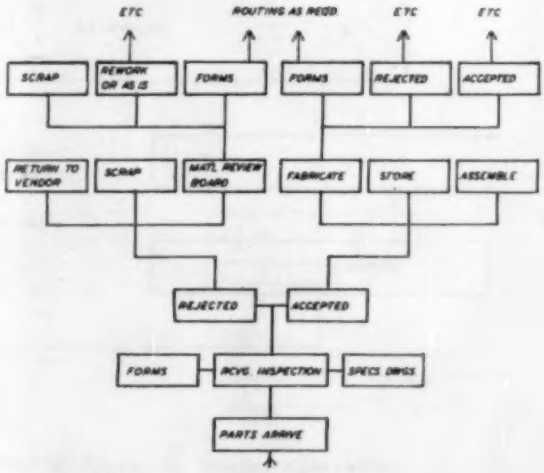



FIG. 5

A DIAGRAM SIMILAR TO THIS COMBINED WITH PICTURES OF FORMS AND A SMALL AMOUNT OF WRITTEN MATERIAL REPLACED A 60 PAGE QUALITY CONTROL MANUAL AND PROVIDED MATERIAL THAT COULD BE USED MORE READILY. WHERE PRACTICAL IT IS DESIRABLE FOR COPIES OF THE SAME FORM TO BE USED FOR AS MANY SEQUENCES AS POSSIBLE.

# OPERATION INTEREST

K. T. OLSEN

Associate Professor of Industrial Education – Woodworking and Carpentry

Stout State College

Menomonie, Wis.

In junior high school, where industrial arts is of an exploratory nature, student interest certainly must be considered instrumental in the attainment of desired objectives.

The Stout State College specializes in preparing teachers of industrial arts. It has long stressed the importance of realizing and meeting the needs of students, no matter what the level of instruction. As a practical project in developing a course of study in industrial arts for junior high school boys, K. T. Olsen, associate professor of industrial education at the college, worked with student teachers James Cook, August Schulz, and George Stephenson both in building a satisfactory study plan and in selecting appropriate projects.

First, however, a brief look at the administrative phase of student teaching proved essential. The student teaching program at Stout State College, under the direction of Dwight Chinnock, offers features similar to those of the typical campus laboratory school through a co-operative arrangement between Stout and the Menomonie High School.

The Menomonie High School furnishes supplies, while Stout State College provides shop facilities and instructors. Approximately 364 students in six grade levels participate in the program. Twenty-two classes meet with their instructors during each nine-week quarter.

Approximately 65 students in four classes comprise the ninth grade, the level with which this article is primarily concerned. Each course in the ninth grade covers 45 hours of classwork. Coverage is therefore necessarily of an exploratory nature.

### The Influence of Student's Age and Interests on This Problem

The next problem confronting the student teachers was building a course of study and selecting projects capable of capturing a student's interest; also, each lesson had to be planned so a satisfactory teaching situation could be presented. In developing the course of study and in selecting projects to be presented to the students, certain fundamental questions were used as guides:

*What are the age levels of the students?* In the situation at hand the students ranged in age from 14 to 17 years. This diversity of ages required certain consideration in project choice.

**PARTIAL ANALYSIS OF 9TH GRADE GENERAL WOODWORK[1]**

| Unit No. | HAND WOODWORKING UNITS<br>HOW TO: | Batting Tee | Stilts | Weather Vane |
|---|---|---|---|---|
| 1 | Sketch an idea | 1 | 1 | 1 |
| 2 | Make a working drawing | 2 | 2 | 2 |
| 11 | Make a bill of material | 11 | 11 | 11 |
| 13 | Select stock for appropriateness | 13 | 13 | 13 |
| 64 | Bore with auger and forstner bits | 64 | 64 | 64 |
| 74 | Fasten with screws | 74 | 74 | 74 |
| 17 | Layout with try square | 17 | 17 | 17 |
| 16 | Measure with rule | 16 | 16 | 16 |
| 46 | Plane a surface true | 46 | 46 | 46 |
| 66 | Smooth with abrasives | 66 | 66 | 66 |
| 82 | Shellac stock | 82 | 82 | 82 |
| 88 | Enamel stock | 88 | 88 | 88 |
| 59 | Saw with a crosscut saw | 59 | 59 | 59 |
| 65 | Drill with twist drill | 65 | 65 | 65 |
| 41 | Cut with chisel | | 41 | 41 |
| 43 | Cut with spokeshave | | 43 | 43 |
| 47 | Plane an edge square with surface | 47 | 47 | |
| 48 | Plane a chamfer | 48 | 48 | |
| 75 | Apply hardware | | 75 | 75 |
| 10 | Cut with hack saw | | 10 | 10 |
| 27 | Score with marking gauge | 28 | 28 | |
| 57 | Saw with coping saw | | | 57 |
| 76 | Glue stock face to face | 76 | | |
| 15 | Transfer a design | | | 15 |
| 20 | Layout curves | | | 20 |
| 39 | Whittle with knife | | | 39 |
| 49 | Plane end grain | 49 | | |
| 58 | Saw with a back saw | 58 | | |
| 72 | Fasten with nails | 72 | | |
| 77 | Glue stock edge to edge | 77 | | |
| 5 | Tighten with wrenches | | 5 | |

[1]*Selected Analysis Hand Woodworking*, K. T. Olsen, copyright, 1950.

Fig. 4

*What are the interests of the students in this community?* As Menomonie has limited indoor recreational facilities, student interests center around the numerous available outdoor activities, such as parks and athletic fields.

*What influence does seasonal change have on student interest?* Each season has its own interest patterns which must be taken into consideration.

The answers to the preceding questions were used as the focal point of the course of study and the projects which were later selected.

Having developed a course of study possessing desirable, essential objectives, the student teachers selected projects which would fulfill these objectives in the season at hand, in this case spring.

### Choosing the Projects

For the student who responded to the age-old call of "play ball," a baseball batting tee, Figure 1, was selected. To the student whose interests lay in the creative realm, a weather vane of optional design, Figure 2, was made available. For the student who wanted to "get up in the world," a sturdy pair of stilts, Figure 3, was designed.

These projects were then presented to the students by the controlled-choice method. Students were allowed to choose one of the three projects mentioned. Sample projects were demonstrated to motivate students, each of these three projects containing a core of basic operations which were common to all three.

Projects were then analyzed for operations and, from these operations, manipulative instructional units were developed. The partial analysis which was used, Figure 4, is included in this article. These instructional units were, in due course, incorporated into the course of study.

On the basis of these instructional units, lectures and check tests were developed. Lectures covering the required informational topics were given on scheduled days and were invariably followed by check

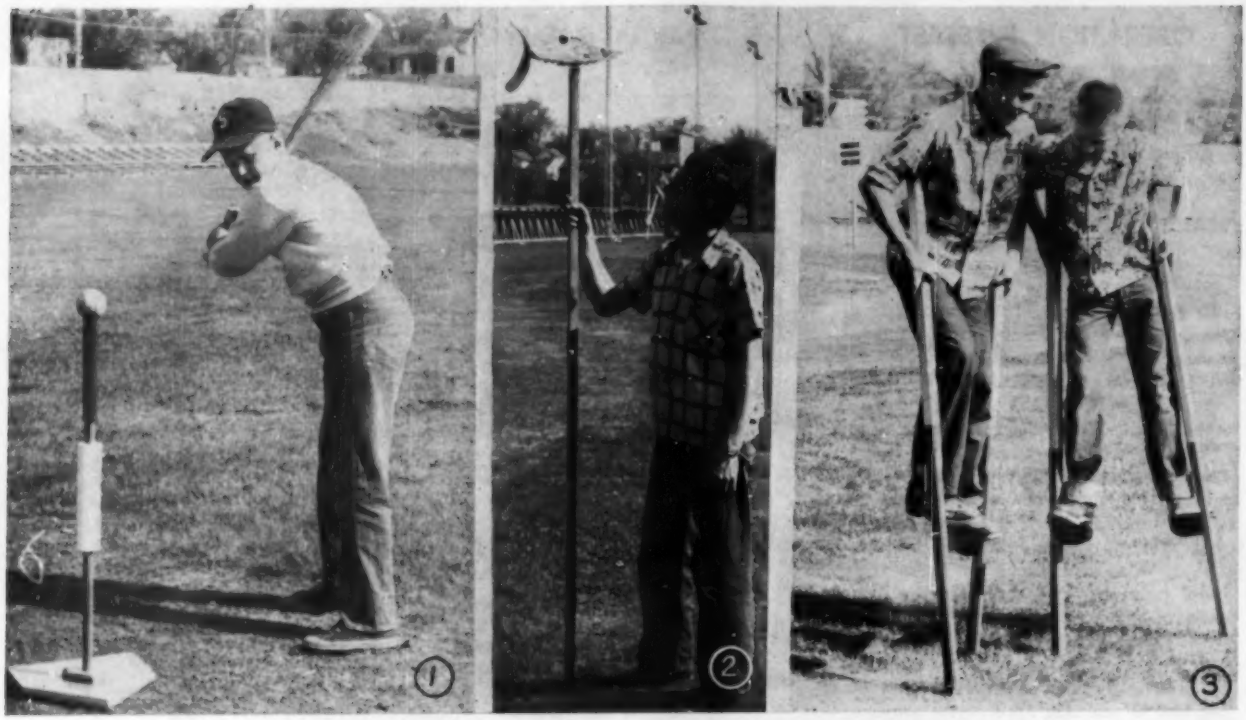


Fig. 1. Baseball batting tee; Fig. 2. weathervane; Fig. 3. stilts

tests. Demonstrations were given as the need arose.

Another phase of the course of study included a student and teacher field day. The field day was an event eagerly anticipated by the students. Taking place on the last day of the course, the field day featured stilt jousting and batting-tee practice, followed by a baseball game.

Thus the student teachers discovered that student interest had reached a new high. This interest peak could be attributed to:

1. A course of study designed for the student;
2. Projects that insured the interest of all students; and
3. Projects that were immediately useful.

## LENGTH OF WIRE ON A SPOOL

**GEORGE P. PEARCE**

Albuquerque, N. Mex.

Most experimenters and builders of electrical devices have a miscellaneous collection of random lengths of insulated wire wound on old spools. They then run into a serious problem when a definite length of wire is needed for some magnet coil, relay, or radio inductance for they do not know for sure if there is enough of the required wire on the spool to do the job because splices usually cannot be tolerated.

This trouble can be avoided if, before winding on the wire for storage, a small hole is drilled through the spool flange close to the core. The starting end of the wire can then be pushed through this hole and bent thus forming an anchor to stop the wire from slipping when winding it on the spool. Now, after the wire is wound, both ends of the wire are available at all times and this makes it a simple matter to find out how many feet of wire are on the spool. All that is needed is an ohmmeter, and practically every electrical experimenter has one.

The following example shows how to proceed: Say a solenoid is needed and calculations indicate that 187 ft. of 27-ga. insulated copper wire is required. A spool of 27-ga. wire is available but whether 187 ft. is on it is not known. Just snap the ohmmeter clips on the ends of the wire and measure the resistance. Say you find it is 13.5 ohms. Multiply this figure by the length of wire per ohm which for No. 27 is 19.43 that is 13.5 × 19.43 gives 262 ft. of wire on the spool. This is more than ample for the job.

Drilling the hole at the bottom of the flange takes but a minute and it pays off every time you want to know if there is sufficient wire on the spool for some winding job.

TABLE NO. 1

| *Size* | *Length per ohm in ft.* | *Size* | *Length per ohm in ft.* |
|---|---|---|---|
| 18 | 156.6 | 25 | 30.90 |
| 19 | 124.2 | 26 | 24.50 |
| 20 | 98.5 | 27 | 19.43 |
| 21 | 78.11 | 28 | 15.41 |
| 22 | 61.95 | 29 | 12.22 |
| 23 | 49.13 | 30 | 9.69 |
| 24 | 38.96 | 31 | 7.68 |

Smaller electric motors with greater power are said to be possible with electric wires using silicone-modified enamel insulation. Tests at Westinghouse Research laboratories, Pittsburgh, show such motors can operate continuously for 10 years at 325 degrees F. without damage to the insulation. *The time is equivalent to normal operation of a washing machine motor for a century. — Industrial Research Newsletter.*

The heaviest known wood in the world, according to the National Lumber Manufacturers Association, is black ironwood, native to the West Indies and the Florida Keys. The lightest wood is believed to be tano, found in Siam and the Malayan Peninsula.

If you are putting your gardening tools away, now is the time to make sure they will be in good shape when you start the new season. Clean rusted parts with steel wool and apply a thinned coat of fresh shellac. — *Shellac Information Bureau.*

Oil-soaked limestone rocks of the Mississippian geologic age, important producing strata in the Williston Basin of North Dakota, are at least 270 million years old. — *Petroleum Newsnotes.*

# Radio, Television, Electronics, Equipment, Tools, and Supplies

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The following listings for Radio-TV training includes all basic necessities. The supply lists include only those supplies which are standard requirements and do not include specific parts and accessories necessary to the repair of specific Radio-TV units. Equipment and small tools are adequate to instruct a class of 16–20 trainees.

## Radio–Television Electronics — Equipment

AMMETER
1. AC, capacity 0–1, 0–2, 0–3, 0–5, 0–10, 0–25, 0–50
2. RF, capacity 0–1, 0–1.5, 0–2, 0–3, 0–5
3. DC, capacity 0–1, 0–2, 0–3, 0–5, 0–10, 0–25

ANALYZER — Capacitator bridge type, capacitance range lmmf to 2000 mfd, resistance range 2.5 ohms to 25 megohms

BATTERY, TESTER — Built in load circuits. 9 pre-fixed positions, provided with blank positions and test prods.

BENCH, RADIO-TV SERVICING — Equipped with 120/240 volt, single phase, a.c. 240 volt, 3 phase a.c., 0–240 volt d.c., 120 volt, 400–800 cycles a.c.

BENCH, SOLDERING — 30 by 32 in. by 8 ft. or similar wired for electric soldering irons

BRAKE, SHEETMETAL — 36, 48, or 60 in., hand operated, capacity 18 gauge

CABINET
1. Small parts, multi drawer, 2, 4, 6, 8, 10, 14, and 18 drawers, metal or wood
2. Storage, general, open or closed, metal

CHECKER, GERANIUM DIODE — Scales, 0.3, 1.2, 6, 12 ma., voltages 3, 12, 120, with rectifier and test clips, 105–125 volts, 50–60 cycle a.c.

CLIPPER, SINE WAVE — 4-position wave selector, output volume control, input and output terminals

DRILL, ELECTRIC — ¼ in. Midget, 115 volt a.c.-d.c., 3 conductor 1150 r.p.m., full load, geared chuck

DRILL, PRESS — Floor or bench type, ½ h.p., 115 v., a.c. 50/60 cycle, or 1 h.p. 220 v., 3 phase a.c. 50–60 cycle, 1725 r.p.m., 10 by 10 in. working table, ½ in. capacity

ELIMINATOR, BATTERY — ATR–"A," 6 volts at 10 amperes or 6 volts at 20 amperes or 12 volts at 10 amperes, 105–125 v., 50–60 cycles, voltage control switch

GALVANOMETER, DC — 500–0–500 micro amperes, 75–0–75 micro amperes

GENERATOR
1. TV Sweep, preset switch positions, channels 2–13, 1F coverage 300 Kc-50 MC, 105–125 v., 50–60 cycles a.c.
2. Sweep & Marker for VHF-TV band, coverage 470–870 MC, variable sweep width, 105–125 v., 50–60 cycles a.c.
3. VHF–FM, 0–50 MC heterodyned output, basic output all channels .5 volt, continuously variable tuning

GRINDER, ELECTRIC — Floor or bench, 6 or 8 in., ⅓ h.p., 115 v., single phase, 50–60 cycle, 3600 r.p.m. or ½ h.p., 220 v., 3 phase, 50–60 cycle a.c.

MARKER — Crystal controlled, 15 position switch, side band and simultaneous 1F marker

MICROAMMETER, DC — Capacity 0–25, 0–50, 0–100, 0–200, 0–500

MILLIAMETER, DC — Capacity 0–1, 0–5, 0–10, 0–25, 0–50, 0–100, 0–200, 0–300, 0–500, 0–1000

OSCILLOSCOPE — 5 or 7 in. screen, direct coupled, push-pull vertical and horizontal amplifier, variable sweep, 15, 30,000 Cps or 3, 30,000 Cps, 105–120 v., 50–60 cycle a.c.

OVEN, ELECTRIC — 225° F. at 1000 watts, motor driven, forced air ventilation, 30 by 25 by 24 in., 110 v., single phase 50–60 cycle a.c.

POT, SOLDERING, ELECTRIC — Capacity 2 lb., 150 watt, 300 watt or 600 watt, 110–120 volt, a.c.-d.c.

PROBES, HIGH VOLTAGE — Capacity up to 50 KV–DC with phone tips and coaxial connectors

SCREWPLATE — 4–36, 6–32, 8–32, 10–24, 10–32, 12–24 machine screw standard, ¼–20, 5/16–18, ⅜–16, 7/16–14, ½–13 NC, ¼–28, 5/16–24, ⅜–24, 7/16–20, ½–20 NF

SELENIUM TESTER — Variable voltage, 25–300 volts a.c., capacity 20–650 ma

SQUARING, SHEAR — 24, 30, or 36 in., foot operated, capacity 18 gauge

TEST EQUIPMENT, STANDS — 18 by 24 by 34 in. high, with wheels, wooden tops

TUBE, TESTER — Direct reading, reproducing simulated operating conditions, 0–3000–6000–15,000 microhms, 110 v.–130 v., 50–60 cycle, a.c.

TRACER — R.F., I.F, and audio signals tracer, minimum speaker 5 in., equipped with jack for connection with voltometer, provides visual measurements, 105–125 volts, 50–60 cycle, a.c.

VISE, JEWELERS' BENCH — 2½ or 3½ in. jaws, swivel or stationary, solid or removable jaws

VOLT (A.C.)–AMMETER — Capacity 0–25, 0–50, 0–100 amperes

VOLTAGE CONTROL — Variation type, voltage 0–130, 0–230 watts, 2 amp., operation on 110–120 v., 50–60 cycles a.c., or 150–300 watt, 65, 75, 90, 100, 115, 130, 145 volts (50–60 cycles)

VOLTOHMYST — 105–125 v., 60 cycle a.c., 7 ranges d.c.–a.c., 30 cps to 3 mc

VOLTOMETER — Calibrated for volts, ohms, milliameters, a.c.–d.c. ranges 0–10–50–250, 1000, 5000, with test leads

WELDER, ELECTRIC SPOT — 3KVA–200 volts-single phase

## Radio–Television Electronics — Small Tools

AUGER BITS — ¼, 5/16, ⅜, 7/16, and ½ in.

AWL — Scratch 6 in.

BATTERY HYDROMETER

BENDER, TUBING 10½ in. — ¼, 5/16, ⅜, 7/16, ½, and ⅝ in.

BLOW TORCH
1. Gasoline ¾ pt.
2. Alcohol ¾ pt.
3. Gasoline pump, heavy duty

BRACE — Carpenters', 8 in. sweep

CARD — Patch, 2, 3, 5 ft.

CLAMPS — "C," small

CLIPS
1. Alligator, fit banana plugs 2 in.
2. Alligator, insulated, black handle, 2 11/32 in., red handle, 2 11/32 in.
3. Battery lead plates, 25 ampere, 2⅜ in., 50 ampere, 4 in., 100 ampere, 6 in.
4. Copper, solid, 50 ampere, 2⅜ in., 100 ampere, 4½ in., 200 ampere, 6 in., 300 ampere, 7¾ in.
5. Crocodile, screw connection 2⅛ in., tip clip 2⅝ in.
6. Flexible
7. Non-ferrous R.F. 1 11/16 in.
8. Snapper, 7 in.
9. Teeth, mesh, 3-sided, 20 ampere, 2 7/16 in., 40 ampere, 2 7/16 in.
10. Test, mesh teeth, 5 ampere, 1½ in., 10 ampere, 1½ in., 10 ampere, 2 in., 10 ampere, 2¼ in.
11. Twin, double end 2 in.

COUNTERSINK — 82° angle, ¼ in. shank, H.S. steel

CUTTERS
1. Hole, adjustable ⅞–4 in., 1–5½ in.
2. Hole extension 1½–8 in.
3. Tubing, capacity 1 in.

DIVIDERS — Wing 6 or 8 in.

DRILLS — Set, fractional, numbered
1. Steel, numbered 1–60
2. Steel, fractional 1/16–½ in.

DRILLS
1. Breast, ¼ in. chuck, 2 speed type
2. Hand, ¼ in. chuck, 2 speed type

DRILLS, ELECTRIC
1. Portable, ¼ in. capacity
2. Portable, ½ in. capacity

FILES
1. Flat, fine, 8 and 10 in.
2. Flat, coarse, 8 and 10 in.
3. Half round, 6, 8, and 10 in. double cut
4. Rat-tail, ½ in. diameter, 6, 8, and 10 in., single cut
5. Round, 8 and 10 in., single cut and double cut
6. Triangular 6, 8, and 10 in., double cut

GAUGE
1. Tap and drill, 1–60, ¼/28 to No. 2/56
2. Drill point, graduated to 1/32 in.

GUN — Soldering, Electric
1. Single heat, 135 watts, 110–120 v., 60 cycle, a.c.; 250

watts, 110–120 v., 60 cycle, a.c.
2. Dual heat, 100–150 watts, 110–120 v., 60 cycle, a.c.; 200–275 watts, 110–120 v., 60 cycle, a.c.

HAMMER
1. Ball peen, 2, 4, 8, and 12 oz.
2. Cellulose, ½ lb.

INSPECTION MIRROR
1. Radio chassis
2. Television

IRONS — Soldering, electric
1. 35 watt, 110–120 v., a.c.-d.c.
2. 40–60 watt, 110–120 v., a.c.-d.c.
3. 80 watt, 110–120 v., a.c.-d.c.
4. 100 watt, 110–120 v., a.c.-d.c.
5. 125 watt, 110–120 v., a.c.-d.c.
6. 200 watt, 110–120 v., a.c.-d.c.
7. 300 watt, 110–120 v., a.c.-d.c.
8. Pencil type
9. Pistol type
10. Miniature type
11. Angle type
12. General purpose type

LEADS, TEST
1. High voltage, 10,000 v., 15,000 v.
2. Needle point
3. Pencil prod, 5, 8 in.
4. Slim line
5. Tenite, heavy duty

PLANE — Carpenters', 8, 12 in.

PLIERS
1. Angle nose, gripping, 7 in.
2. Assembly, 8 in.
3. Chain nose, 4½ in.
4. Channel-lock, 10 in.
5. Combination, 6 in.
6. Curved needle nose, 6 in.
7. Diagonal, 5, 6, or 7 in.
8. End cutting, 7 in.
9. Insulation skinning, 6 in.
10. Long flat nose, 6 in.
11. Needle nose, 6 in.
12. Non-magnetic, 6½ in.
13. Plastic cutting, 6 in.
14. Round nose, 4½ in.
15. Side cutting, 6 or 7 in.
16. Terminal installation, 7½ in.

PULLERS, TUBE
1. Miniature tubes
2. Standard tubes

PUNCHES
1. ½, 5/8, ¾, 1, 1 1/16, 1 1/8, 1 5/32, 1 5/16, 1 1/4, 1 3/8, 1 1/2, 2 1/4
2. Key, 1 5/16, 1 11/64, 1 11/64, and 1 27/64 in.
3. "D" Type, ½ in.
4. Square, 5/8, ¾, 1, 1 1/16, 1 3/8 in.

REAMER, TAPERED — ⅛ and ½ in. by 5½ in.

RULE
1. Folding, 6 in.
2. Steel, 12 in.

SAWS
1. Crosscut
2. Hack, 10 and 12 in. blades
3. Keyhole, 7½ in.
4. Stickleback, ¼ by 7 in.

SCREWDRIVERS
1. 4 and 5 in. by ⅛ in. blade
2. 6 and 7 in. by ¼ in. blade
3. Duplex, 7 in.
4. Insulated, 9 in.
5. Long shank, with screw holding clips
6. Phillips, No. 4, 5, 9, 10, and 16
7. Regular, 4½ and 8¼ in.
8. Set, 5 and 6 in.
9. Set blades, .100, .080, .070, .055, and .040 in.
10. Set, jewelers', blades, .1, .08, .07, .055, .040, and .025 in.
11. Flexible shaft 7¼ by 7/32 in. tip
12. Offset, Phillips, Nos. 1 to 9; and standard
13. Magnetic, blade, 2½, 4 and 5½ in.
14. Ratchet, 12½ in. closed

SCRIBER — 9 in.

SNIPS
1. Line, 7 by 1⅝ in. cut
2. Aviation, right hand, 10½ by 1¾ in. cut; left hand, 10½ by 1¾ cut

SOCKETS
1. Flex-drive, 3/16, ¼, 5/16, 3/8, 7/16, and ½ in.
2. Midget, 3/16, ¼, 5/16, 3/8, 7/16, 11/32, and ½ in. with ¼ in. drive and T-handles, ratchets and universal
3. Spin-tite, 3/16, ¼, 5/16, 11/32, 3/8, 7/16, and ½ in.
4. Flexible drive, 3/16, ¼, 5/16, 3/8, 7/16, and ½ in.

STRIPPERS, WIRE — Capacity No. 30 to No. 8 wire

TACKER, STAPLING — 300 ohm cable

TERMINATED TOOL — 7½ in. wire sizes No. 22 to No. 10

TOOLS, ALIGNMENT
1. Aligners: slim, dual, hex-square, nib, stub
2. All purpose
3. Nylon, molded, TV-FM
4. Tuner, TV channel
5. Wand tuning

TROUBLE LAMP — 105–125 v., a.c.

WRENCHES
1. Adjustable, crescent, 4, 6, 8, 10, and 12 in.
2. Allen screw Nos. 4, 5, 6, 8, 10, also ¼ and 5/16 in.
3. Box, ¼, 5/16, 3/8, 7/16, ½, 9/16, 5/8, and ¾ in.
4. Bristol, No. 2 to 3/8 in.
5. Capacitor mounting
6. Nutdriver, ¼ in. amber handle 6 in.; 3/16 in. amber handle 9 in.; 5/16 in. blue handle 6 in.; 5/16 in. yellow handle 6 in.; 3/16 in. black handle 6 in., 7/32 in. brown handle, 6 in.; ¼ in. red handle 6 in.; 7/16 in. amber handle 7 in.; 11/32 in. green handle 6 in.
7. Open end, 5/16, 3/8, 12/32, 7/16, ½, 9/16, and 19/32 in.
8. Ring, spin-tite

# Radio — Television Electronics — Supplies

ALUMINUM — 20, 18, and 16 ga. sheets

ANGLE, BRASS — ½ by ½ by 1/16 in.

BATTERIES, PORTABLE
1. "A", 1½, 4½, 6, 7½ volts
2. "B", 45, 67½, 75, 103½, 300 volts

BEARINGS, PANEL

BLADES, HACKSAW — 10 and 12 in., 24T

SAL AMMONIAC, BLOCKS — 1 lb.

BRAID, SHIELDING — I.D. ⅛, 1/64, 3/16, ½, and 25/32 in.

CARBON TETRACHLORIDE

CEMENT — coil, plaster, radio, rubber, speaker cone, vinylite

FUSES
1. 3 AG, 250 v. 1/16 amp. to 8 amp.
2. 3 AG, 32 v. 5 amp. to 30 amp.
3. 8 AG, 1/500 amp. to 5 amp.
4. 3 AG, TV pigtail, ¼ amp. 125 v.; ¼ amp. 250 v.
5. AG, TV pigtail, ¼ amp, ⅛ amp, 250 v.

FUSE PLUGS — 15, 20, 25, and 30 amp.

GREASE
1. Self-lubricating
2. Semi-solid
3. Short fiber

GROMMETS, RUBBER — ¼, 5/16, 3/8, ½, and ⅝ in.

LACQUER
1. Crystallizing
2. Insulating

LAMPS, MINIATURE — Volts 1.1, 1.3, 1.9, 2.0, 2.2, 2.3, 2.4, 2.5, 2.7, 2.15, 3.2, 3.6, 3.8, 6.0, 6.2, 6–8, 18, 28

LUGS — Solder, No. 8 and No. 10

MASONITE — Ripple finish, ⅛ in. smooth

MATERIALS — Crackle finish (Kem Art metal finish, tri-seal)

MACHINE OIL — SAE 10–20

NUTS — Steel, hexagon head
1. Acorn, self locking, 6–32 by ¼ in., 8–32 by ¼ in., 10–32 by 3/16 in.
2. Speed, self locking, 4–36 by ¼ in., 6–32 by 5/16 in; 8–32 by 5/16 in.

PAINT — Luminous (non-poisonous), shielding

PASTE — Solder

POST, BINDING — Bakelite-brass
1. Single, hole 3/32 in., screw 6–32 by ½ in.
2. Twin, hole 3/32 in., screw 6–32 by ¼ in.
3. Triple, hole 3/32 in., screw 6–32 by ¼ in.

QUARTS — 3 by 8 by .1 in.

ROD — Brass, ¼ in, round, and brass, ¼ in. square

SCRAPS — Bakelite and hard rubber

SCREWS
1. Brass, machine, flat head with nuts, 4–36, 6–32, 8–32, lengths of ¼ to 1½ in.; round head with nuts, 4–36, 6–32, 8–32, lengths of ¼ to 1½ in.
2. Ornamental head, 6–32, 8–32
3. Steel, binding head, machine, 6–32 by ¼ in., 6–32 by 3/8 in., 6–32 by 5/16 in., 6–32 by ½ in., 8–32 by 5/16 in., 8–32 by 3/8 in., 8–32 by ½ in.
4. Steel, phillips head, 6–32 by ¼, ½, and ¾ in.; 8–32 by 5/16, ½, and 1 in.
5. Steel, round head, 4–32 by ¼ in., 4–36 by ½, and ¾ in., 6–32 by ¼, ½, ¾, 1, and 1¼ in., 8–32 by ¼, 3/8, ½, ¾, and 1 in., 10–32 by ½, ¾, and 1 in.
6. Steel, self-tapping, flat-slotted, hex. head, 4 by ½, 6 by ¼, and ½ in., 8 by ½, and 1 in., 10 by ½ in.

SOLDER — 40–60 multicore, 50–50 non-corrode

SOLUTIONS, LYE

SOLVENT, CEMENT

SPRINGS, DIAL DRIVE — Assorted sizes

STAPLES, INSULATED — 5/16 in.

STEEL — Sheet, galvanized, 1/16 in.

STOCK — Sheet, amphenol polystyrene

STRIPS
1. Brass (half-hard) ½ by 1/16 in.
2. Wiring, terminal-lug

TAPE
1. Plastic label, 5/16, ½, 5/8, ¾, 1, 1½, and 2 in. widths black, blue, red, green
2. Radio friction, ⅝ in. width
3. Insulation, plastic backing, ¾ in., 10KV, 200,000 megohms

TERMINALS
1. Ring, 4/6, 8/10
2. Spade, 4/6, 8/10

THINNER, CEMENT

TUBING
1. Bakelite, OD 1, 1½, 2, 2½, 3, and 3½ in.
2. Polystrene OD ¼, 5/16, 3/8, ½, 5/8, ¾, 1, 1½, and 2 in.
3. Insulating, varnished cambric, I.D. .034, .042, .053, .066, .083, and .106 in.

VARNISH — Insulating, Wrinkle

WASHERS
1. Cup, Nos. 6, 8, and 10
2. Fiber, Nos. 6, and 10
3. Lock
4. Plain
5. Split, Nos. 6, 8, and 10
6. Star, internal, Nos. 6, 8, and 10

WIRE
1. Cellulose braid lacquered
   20 AWG solid
   20 AWG 10 by 30 stranded
   18 AWG solid
   18 AWG 16 by 30 stranded
   Red, black, blue, green, yellow, orange, white, brown
2. Thermoplastic insulated
   22 AWG solid
   20 AWG solid
   22 AWG 7 by 30 stranded
   20 AWG 10 by 30 stranded
   18 AWG 16 by 30 stranded
   Black, brown, red, orange, yellow, green, blue, violet, gray, white
3. Rubber insulated push back, 20 AWG 10 by 30 stranded
4. Magnet, plain enameled, size: 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, and 40
5. Magnet, single cotton enameled, size: 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, and 40
6. Aerial No. 25 stranded
7. TV lead in, 300 ohm, 150 ohm

# Ceramics Shop Equipment, Tools, and Supplies

**E. W. CARLS**
Vocational Instructor
Department of Corrections
Chino, Calif.

KICK WHEEL — 27 by 20 in. worktable, regulated speed

KILN, ELECTRIC — 18 by 18 by 18 in. firing chamber, 220–230 volt, top opening, floor model

KILN, ELECTRIC — 15 by 21 by 18 in. firing chamber, 220–230 volt, single phase with pyrometer and automatic cut-off, with storage cabinet opening at front

MILL, BALL — ⅛ h.p. motor drive, 110 volt, 60 cycle, a.c., millspeed 60–70 r.p.m.

MIXER, PORTABLE — ¼ h.p. motor, propeller size 3 in., shaft ½ in. dia. and 30 in. long

POTTERS WHEEL — Floor model, ¼ h.p. motor, 110–115 a.c., single phase, equipped with throwing head

SCALE, POTTERY — Capacity 2616 grams (6 lbs.) with extra weights

SPRAYER — ¼ h.p. motor, compressor, internal mixer and spray gun with air hose

WEDGING BOARD — 22 in. wide, 14¾ in. deep and 14 in. high, wood and plaster construction

WORK BENCH — 34 in. height, 24 in. deep, 12 ft. length (minimum). Equipped with storage cabinets below

## Ceramic Shop, Hand and Other Small Tools

BRUSHES
1. Flat type ox hair, size ⅛, ¼, ½, and ¾ in.
2. Red sable, fine, sizes 00, 0, 1, 2, 3, 4, 5, 6, hair length 5/16 to 19/32 in.
3. Stencil, white bristle, tin ferrule, wood handle, 2, 3, 5, 6, and 8

CONES, PYROMETRIC — Nos. 002 down to 01 by units and No. 1 to No. 10. Range in fahrenheit from 1121 to 2786 deg.

CYLINDER — Graduated glass, blue line, with enlarged base, 200 ml. capacity

FETTLING KNIVES

MODELING TOOLS
1. 5, 6, and 8 in. length, set of 16 assorted all wood and wood and metal
2. Lace, stainless steel, set of 6 assorted

MODELING WHEELS — Non-corrosive head, ball bearing, 8 in. head

MORTARS — Porcelain, colors, sizes No. 4 and No. 8, with pestles

PANS, MIXING — Aluminum, 6 compartment 5½ by 3¾ in.

SGRARRITO TOOLS — Set of six assorted

RESPIRATORS — Cellulose filter type, approved by U. S. Bureau of Mines

RESPIRATOR, REFILLS

SHELF SUPPORTS — 1 by 1 by 1 in., 1 by 1 by 3 in., 1 by 1 by 4 in., 1 by 1 by 8 in.

SHELVES — ½ by 10 by 14 in. silicon and 16 by 16 by ½ in. refractory

SIEVES — Metal frame 8 in. diam., 2⅜ in. high, 1⅜ in. depth to brass cloth, complete with pans and lids, 80, 100, 150, 200, and 300 mesh

SLIP TRACER — Rubber bulb, 1½ oz. capacity

SPATULAS — Stainless steel, wood handle, 3½, 4½, and 5½ in.

SPURS — ⅜ in. high, ⅞ in. point to point

STILTS
1. Star type, ¼, 1, and 1½ in. (4 point)
2. Double pointed (3 points), Nos. 1 to 12

THROWING HEADS — Aluminum, heavy

TONGS, DIPPING — Rust proof plating, set of 3, 90°, 45°, and straight

TRIANGLES — Nos. 1 to 4

TURNING TOOLS
1. Half moon, right and left, 9 in. length approx.
2. Triangle, 9 in. length aprox.

## Ceramics Shop Supplies

ACETONE — Brush cleaner

APPLICATION MEDIA

BALSAM OF COPAIBA

BENZOL — Diluting and brush washing

BONE ASH — Dust, 200 mesh.

CLAY
1. Modeling, prepared
2. Modeling, dry
3. Slip casting, white, dry
4. Ball, 200 mesh
5. Bentonite
6. Jordan — dual purpose
7. China or Kaolin

CORNWALL STONE — For warp prevention

ENGOBES — Assorted colors

FELDSPAR — Potash or soda

FRENCH FAT OIL

FRIT — Borosilicate, leadless, lead frit, high soda

GLASS, GROUND

GLAZE
1. Majolica, low fire
2. Transparent, crackle
3. Matt, crystalline

GROG
1. 150 mesh microsil
2. 6, 20, and 40 mesh

HYDROCAL

MOLDS — Ready made

MOLD MATERIAL — Rubber latex

NEPHELINE SYENITE

OIL OF COPAIBA

OIL OF LAVENDER

OVERGLAZE
1. Prepared and dry
2. Metallic
3. Luster

POTTERS PLASTER

SOAP — Mold separating

SODIUM CARBONATE — 10 per cent solution

SODIUM SILICATE — 40 per cent solution

TALC — Ceramic, 200 mesh

TETRASODIUM PYROPHOSPHATE

TURPENTINE

UNDERGLAZE — prepared

# Lapidary Shop, Equipment, Tools, and Supplies

**E. W. CARLS**
Vocational Instructor
Department of Corrections
Chino, Calif.

BENCH

BUFFING AND POLISHING UNIT

DRILL — Lapidary

FACETING HEAD OR UNIT

GRINDING UNIT

LAPPING UNIT

SANDING UNIT
1. Disk
2. Drum

SLABBING SAW

TRIM SAW

## Small Tools and Equipment

ANVIL — Bench

BLADES — Jewelers' saw

BUNSEN BURNER

BLOW PIPE

BLOW TORCH

BRUSHES — Borax

CALIPERS — Vernier

DAPPING PUNCHES — Set

DAPPING DIE

DAPPING BLOCK — Lead

DIVIDERS, WING — 8 in.

DOP STICKS — Assorted, wood

DOPS — Metal

DRILL — Hand, ¼ in. capacity, 12 in. overall

DRILL TUBES — 13, 14, and 17 gauge

DRILLS — Carbon steel-set, 1/16 to ¼ in. by 32nds

FILES, JEWELER'S
1. Hand, flat, 4, 6, and 8 in.
2. Half round, 4, 6, and 8 in.
3. Round, 4, 6, and 8 in.
4. Ring, 6 in.
5. 3-cornered, 6 and 8 in.
6. Swiss pattern needle-set of 12, 5½ in. assorted

GAUGE — Sheet metal

HAMMERS
1. Ball peen, 2 oz. and 4 oz.
2. Chasing, 1¼ in. face-number 2
3. Peening and staking, 8½ in.
4. Plastic
5. Rawhide (mallet) 6 oz. and 10 oz.
6. Planishing

LAPS
1. Iron or steel
2. Tin
3. Copper
4. Lucite
5. Aluminum
6. Type metal

PLIERS
1. Chain nose, 4½ in.
2. Half round nose, 5 in.
3. Forming, 4½ in.
4. Needle nose, 6 in.
5. Flat nose, 4½ in.
6. Diagonal cutters, 6 in.
7. End nippers, 5 in.

POLISHER — Leather
1. Felt sheel
2. Cloth buff

RING HOLDER
RING MANDREL
SANDER
1. Hollow head
2. Plain head
3. Drum

SAW BLADES — Diamond bonded
SAW FRAME — Jewelers, adjustable to 3 in. throat
SCREWDRIVER
1. 8 in.
2. Jewelers

SCRIBER — Awl type, 5½ in.
STONE PUSHER
TEMPLATE — Cabochon type
1. 20°
2. 30°
3. 45°
4. 60°

TEMPLATE — Stone gauge
TEMPLATE — Gem type
TIN SNIPS — 7, 10, and 12 in.
1. Straight
2. Circle cutting

TWEEZERS
1. General purpose
2. Soldering
3. Gem, spring type

## Supplies

ABRASIVE
1. Cloth, emery, 200; 300, 4/0, 5/0, 6/0, 7/0, 8/0, 10/0; 400; garnet, 200; 300; 4/0, 5/0, 6/0, 7/0, 8/0, 10/0; 400
2. Crocus cloth
3. Grit
4. Paper, silicon carbide, assorted grits
   a. Emery (corundum)
   b. Diamond bort
5. Scotch stone, ¼ by 5 in. sticks

CEMENT
COOLANT
CUTTING COMPOUND
FLUX
HARDNESS SET — Mohs' scale
LACQUER — Metal, 4 oz. bottles
POLISHING COMPOUND
1. Cerium oxide
2. Diamond dust, 3200 and 6400 mesh
3. Rouge, jewelers
4. Tripoli

ROCK — Slabs or rough material
SOLDER — Silver
1. Clipped
2. Wire type

SPONGES
STEEL WOOL — Pads, No. 00, No. 000, No. 0000
STONE — For setting cabochons

# Leathercraft, Tools, and Supplies

**E. W. CARLS**
Vocational Instructor
Department of Corrections
Chino, Calif.

## Leathercraft, Tools

BOARD, MAPLE — Cutting ¾ by 7¾ by 10¾ in. or larger
CREASER, METAL EDGE — Sizes 1, 2, 3, 4, and 5
EDGE BEVELER
EDGE TOOL
EMBOSSING CARRIAGE — Complete with set of wheels
EXTENSION BLADES
1. No. 2 bevel
2. No. 1 lance point
3. No. 0 sharp point
4. No. 00 curve point

EXTENSION BLADE HANDLE — Patented, plastic, unbreakable
EYELET SETTER
FID OR BELT AWL — 2¼ in. blade
FINISHING WHEEL
FOLDER, BONE — 6 in.
GAUGE, DRAW — Length of slide 4 in., with extra blades
HAMMER — Shoe or cobblers, 12 oz. No. 00
KNIFE
1. Incising, beveled blade
2. Square point, blade 4 in. long and 1 in. wide
3. Round, 5 in. blade
4. Head, 4½ in. blade
5. Skiving, bevel point
6. Swivel top cutter, with extra blade

MALLET, WOOD — Preferably lignum vitae
MODELING TOOLS — Rubber handle, stainless steel, in several patterns including, pointed, flat, deer foot, ball end, diamond point, and combination point
NEEDLES, LACING
PLIERS, LACING — 5¾ in. single joint
PRICKING WHEEL
PUNCH
1. Revolving head, tube sizes 1, 2, 3, 4, 5, and 7
2. Revolving head, tube sizes 2, 4, 6, 7, 8, and 10
3. Drive, sizes 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9

RIVETER, PATENTED — For tubular or split rivets
SHEARS, LEATHER — 8 and 12 in.
SKIVER, PATENTED TYPE — Complete with extra blades
SNAP FASTENER SET — Beginners set, 4 in. flat anvil, 2 bodkins
SPACE MARKER — 5, 6, or 7 spaces per inch
SQUARE, STEEL — 12 in. blade, 7 in. tongue, 1 in. width
STAMPS — Wide variety needed
STIPPLER — Background
THONGING CHISELS
TRACER — For design tracing

## Leathercraft Supplies

BEESWAX
CEMENT
1. Waterproof, flexible type, all purpose
2. Rubber

DYE — Leather, assorted colors, liquid and powder
HARNESS WAX
HANDSEWING WAX
OIL, NEATSFOOT
RIVETS
1. Tubular
2. Split
3. Rapid (Rivet and cap type)

SADDLE SOAP
SNAP FASTENERS
1. Button
2. Socket stud
3. Eyelet type

# News Notes

### CONTEST FOR AMATEUR CERAMISTS

Eastern Ceramic League Inc., of Newark, N. J., announces the 5th Annual Amateur Ceramic Hobby Contest. All Amateur Ceramists are invited to enter this contest which will be conducted during the Eastern Ceramic and Hobby Show, May 4 through 9, 1957, at Convention Hall, Asbury Park, N. J.

Entry blanks may be obtained from the chairmen: M. Morris, 1736 River Road, Belmar, N. J.; or L. Mansmann, 108 Gainsboro Road, Trenton, N. J. The contest closes April 18, 1957.

### STUDENT PHOTOGRAPHIC SHOW

The first public event in the People-to-People Program suggested by President Eisenhower last September opened on February 25, when the exhibition of the PSA Foreign Students Photo Contest went on show in the Time & Life Reception Center in Rockefeller Plaza. The theme of the contest, with entries limited to foreign nations enrolled in recognized colleges and universities in the United States, is "My Impressions of the U.S.A."

The official opening was marked by a reception attended by ambassadors to the United Nations or to Washington from the 26 nations represented in the exhibit plus numerous members of the Washington official family and many of the committee chairmen of the People-to-People Partnership.

The seventy-three photographs by nations of 26 countries attending 42 educational institutions in the United States remained on exhibition for three weeks, and are now being circulated throughout the free world, to show just how we in the U. S. A. look to our valued guests. The same show will be seen in the Paris office of TWA.

The exhibition was opened by Ambassador Henry Cabot Lodge, Jr., who presented President Eisenhower's special message. Nineteen prizes, valued at more than $3,000, were awarded.

The Photographic Society of America is proud to have been able to help in establishing one of the important means of contact of People-to-People.

For further information write to *Norris Harkness, chairman, People-to-People Photographic Committee, Hardale, 30 East 60th St., New York 22, N. Y.*

just out!
BIG SAVINGS ON SCHOOL SPECIALS
POST
USE THE ATTACHED POSTAGE PAID ORDER FORM—ORDER NOW—SAVE ON AN ENTIRE YEAR'S SUPPLIES

# 1957-58 POST "SCHOOL SPECIALS" BROCHURE

## Handy buying reference for mechanical and architectural drawing teachers

Everything your students need in drawing supplies is colorfully illustrated and completely described in the 1957-1958 POST School Supplies Brochure.

Every year more and more instructors are turning to this valuable buying guide as an easy, economical way to order quality supplies. The extremely convenient layout with the special prices shown adjacent to each item makes POST's Brochure the most frequently referred to buying guide in more and more schools.

### *just a word about price*

Despite rising costs, some of the items in the 1957-1958 Brochure are *lower priced than the school discount prices of 1956* due to POST's own integrated woodworking plant. And, all prices are guaranteed for the entire school year.

Send for your free POST 1957-58 School Brochure today. It's easy to use and easy to order from. Many instructors tack it up on the bulletin board for their students' reference.

*For your free copy, write to Educational Sales Division, Frederick Post Company, 3648 N. Avondale Ave., Chicago 18.*

POST

## PERSONAL NEWS

(Continued from page 10A)

of such organizations as the American Vocational Association, National Association of Industrial Educators, and New York State Vocational and Practical Arts Association.

Among his many honors is the designation as "Man of the Year" in Industrial Arts Teacher Education in 1955 awarded by the American Council on Industrial Arts Teacher Education. Also, in 1955 Dr. Wilber received a citation from the State University of New York College for Teachers at Buffalo as an "Outstanding Alumnus."

Dr. Wilber has written extensively for publication: authored the book, *Industrial Arts in General Education*, which has had several printings and was revised in 1952; collaborated with B. Osburn on the book, *Pewter: Spun, Wrought and Cast*, and coauthored with E. Neuthardt, *Aeronautics in the Industrial Arts Program*. In addition, he has written many magazine articles for the fields of industrial arts and vocational education.

### WILLIAM F. PATTERSON PROMOTED

From director of guidance and placement at Milwaukee's vocational school to special assistant to James P. Mitchell, United States secretary of labor, is the long stride taken by William F. Patterson, a former Milwaukeean. His promotion from director of the bureau of apprenticeships, department of labor, at Washington, D. C., was announced just before his assignment to a recent meeting of the Southeast Asia Treaty Organization conference at Bangkok, Thailand.

Mr. Patterson, a native of Madison, Wis., is widely known among Wisconsin industrialists and union labor leaders. In his position with the Milwaukee Vocational School, he set up scores of apprentice training programs in Milwaukee and Wisconsin firms.

He was called to Washington 22 years ago, on the recommendation of the late Dr. Robert L. Cooley, director of the vocational school, and a national authority on vocational guidance.

♦ DEWEESE W. STEVENS is serving as vice-principal at the Palo Verde High School, Blythe, Calif.


Now..., TEACH ALL GAS PROCESSES WITH ONE BLOWPIPE in the PREST-O-LITE Trade-Mark No. 420 OUTFIT

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CUTTING

LIGHTWEIGHT * VERSATILE * EASY TO USE

One blowpipe for teaching *every* job. No attachments needed; just change the tip. Welds up to 3/8 in., cuts up to 2 inches. Complete outfit includes double-duty blowpipe with four tips, gas regulators, friction lighter, wrench, hose, and goggles —all for $76.50. See it today at any LINDE jobber, or write for further information.

(New free booklet, "LINDE Aids to Oxy-Acetylene Welding and Cutting Instruction," describes slide and motion picture films that make teaching easier, learning more complete. Your copy is ready now. Just ask for F-50142.)

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A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
Offices in Other Principal Cities
In Canada: LINDE AIR PRODUCTS COMPANY
Division of Union Carbide Canada Limited, Toronto

The terms "Linde" and "Prest-O-Lite" are registered trade-marks of UCC.


## New Publications

### Teaching Multiple Activities in Industrial Education

By G. Harold Silvius and Estell H. Curry. Cloth, 484 pp., 6½ by 9¼ in., illus., $5. McKnight & McKnight Publishing Co., Bloomington, Ill.

This text covers the organization and management of general shop classes but its approach is wider than that most commonly thought of as general shop. The method procedures which are detailed are of value in all general industrial education classes where more than one type of activity is going on at the same time.

The selection of topics in this book is based on an analysis of the activities of successful teachers and further upon those activities with which beginning teachers most frequently experience difficulties. The authors have gathered an outstanding number of procedures used by successful teachers, have analyzed these in terms of general use, and have presented them in a well-organized and concise manner. Study questions, student activity, and additional readings, make the book suitable for text use as well as for teachers in-service.

### Practical Carpentry

Edited by Floyd M. Mix and Ernest H. Cirou. Cloth, 480 pp., 8½ by 10⅝ in., illus., $5. Goodheart-Willcox Co. Inc., Chicago, Ill.

A text which serves well for giving a comprehensive understanding to students and apprentices on the subject of carpentry. The book is excellently illustrated and the descriptions are clear and to the point.

It describes how to make the forms for necessary concrete work; how to measure and select lumber; house framing methods; floor, and wall framing; roof types and framing; exterior wall construction; roofing materials and installation; thermal and sound insulation; windows, doors, and staircases; interior finishing; installing cabinets and built-ins; floors; chimneys and fireplaces; farm building construction; garages; planning a new home; and building with plywood.

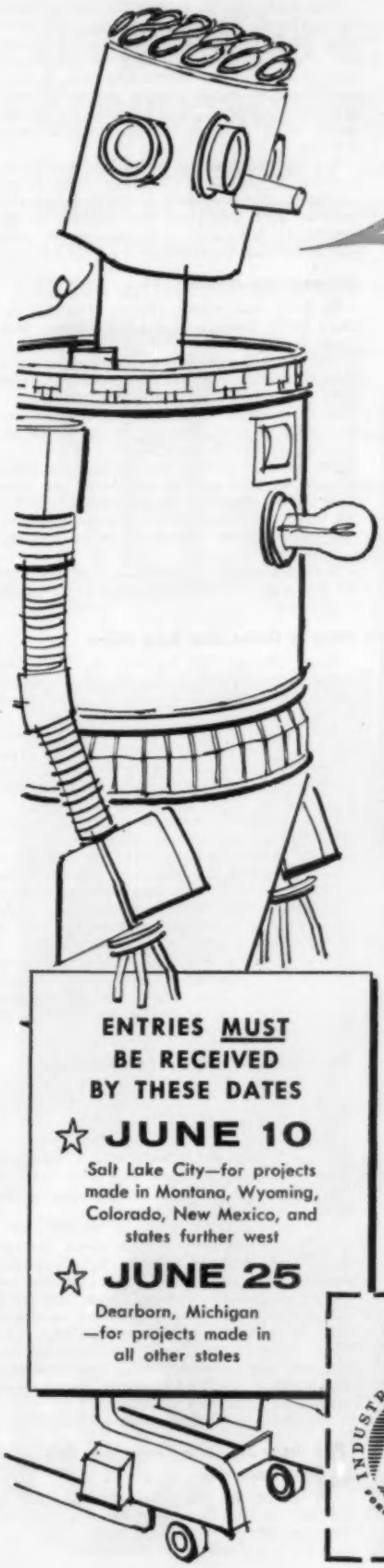
There also is a section on constructing scaffolds, installing attic fans, and a glossary of building and housing terms.

### Your Opportunities in Industry As a Skilled Craftsman

Paper, 32 pp., 6 by 8½ in., illus. National Association of Manufacturers, 2 East 48th St., New York 17, N. Y.

This brochure describes the need of craftsmen in American industry and explains what is required of the boy who wants to be a millwright, tool and die maker, maintenance electrician, all-round machinist, patternmaker, draftsman, or of the boy interested in atomic energy.

(Continued on page 22A)



$$\frac{B^2}{2} \times \frac{A - C^4}{D} \div A \times -\sqrt{X + B} \times A \; !!$$

**TRANSLATION**

If you and your students want to get in on the fun of the biggest industrial arts competition in the country...

*better sign up now!*

Nothing can put you and your students in the national limelight like Ford Motor Company's Industrial Arts Awards Program!

It's the biggest, best-recognized program of its kind . . . winning praise, cash prizes and exciting, all-expense, 3-day trips to Detroit for talented student-teacher teams . . . year after year!

**What can be entered?** Any industrial arts or industrial vocational project made by students in the 7th through 12th grades . . . under the supervision of shop or drawing teacher.

**Are special projects necessary?** Not at all. Anything made in connection with regular class work is acceptable. One of the prime objectives of I.A.A. is the promotion of excellence in school work . . . and that's why teachers find I.A.A. so much to *their* advantage. *You will, too!*

**ENTRIES MUST BE RECEIVED BY THESE DATES**

☆ **JUNE 10**

Salt Lake City—for projects made in Montana, Wyoming, Colorado, New Mexico, and states further west

☆ **JUNE 25**

Dearborn, Michigan —for projects made in all other states

*Enter your students now*

**FORD INDUSTRIAL ARTS AWARDS, Dept. B**

**FORD MOTOR COMPANY, The American Road, Dearborn, Michigan**

I am anxious to have the official I.A.A. rules booklet and entry blanks. Please send to:

NAME _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

## NEW PUBLICATIONS

(Continued from page 20A)

### TV Manufacturers' Receiver Trouble Cures, Vol. 8

Edited by Milton S. Snitzer. Paper, 128 pp., 5½ by 8½ in., illus., $1.80. John F. Rider, Publisher, New York, N. Y.

Volume 8 is devoted to the official design laboratory cures for *bugs* which may be encountered in TV receivers. The cures are positive. The troubles are identified and correlated with specific receiver chassis and models.

This is authentic information on TV receiver trouble cures, and this brochure contains new material which deals with manufacturers from RCA to Zenith.

### General Society of Mechanics and Tradesmen — Report for the Year 1955

Paper, 115 pp., 5 by 9 in., published by the Society. This is an interesting report (the 170th) issued by this famous organization which dates in the early days of our Republic.

It organized its own school known as the Mechanics Institute in 1820, but this was no longer needed because of the establishment of the New York school system in 1858. Instead of its day school, an evening school was started in 1858 for the technical training of young men employed during the day.

### Frequency Modulated Radio

By K. R. Sturley. Cloth, 120 pp., 5 by 7½ in., illus., $3. The Macmillan Co., New York, N. Y.

This book aims to explain the general principles, theory, design, construction, and servicing of V.H.F./F.M. equipment in terms that the amateur constructor, the student of electronics, and the serviceman who has to make an F.M. receiver work, can understand the very complicated and scientific instrument which he is studying, or upon which he is working.

The chapters present the general principles; methods of producing frequency modulation; reception of frequency-modulated signals; tests on F.M. receivers; and features of the combined long-wave, medium-wave, and V.H.F. broadcast receivers.

### Printers' Arithmetic

By F. C. Avis. Cloth, 148 pp., 5 by 7¼ in., illus., $4.75. Philosophical Library, Inc., New York, N. Y.

This useful and interesting book gives a comprehensive view of the problems which need solution by the printer and publisher.

It is especially important to student and apprentice printers, and equally useful for the practical printer in the shop.

The book is divided into six sections which present methods used in calculating the space used for the copy furnished when set in different type sizes, when leaded, when filling various shaped spaces, and when set in abnormal type widths.

Besides giving a large number of problems for the reader to solve, the book also contains a glossary.

### How to Drive and Stay Alive

Paper, 30 pp., 5¾ by 8½ in., illus., free distribution. Published by the B. F. Goodrich Company, 10 East 40th St., New York 16, N. Y.

This color booklet is illustrated to show good and bad driving practices on all types of roads and under varying conditions, and contains tips for teen-agers, for adult drivers, for vacation travel, and for city driving.

Also included is a visual check list, recommending the parts of a car which ought to be checked at least twice a year. There is also a quiz-type check list aimed at preparing the motorist to cope with common emergencies. Another section illustrates 12 safety rules which should be taught children who ride in the family car. The two worst enemies of highway safety are bad driving and bad tires, hence, join the national safety crusade against both. This booklet is being made available free to the public by some 30,000 B. F. Goodrich retailers.

### Machine Tools for Metal Cutting

By W. H. Armstrong. Cloth, 347 pp., 6¼ by 9¼ in., illus., $5. McGraw-Hill Book Co. Inc., New York, N. Y.

An excellent text for giving engineering students technical information about materials, tools, and processes that will assist them in their study of machine design, time study, production planning and control.

The 16 chapters present in readily understandable terms, information about machine tools; measurements; fits; metal cutting; turning and boring machines; drilling and milling machines; abrasives, bonds, and grinding wheels and machines; planing machines; broaching; cutoff and sawing machines; electrical-discharge machining; ultrasonic machining and chem-milling; semiautomatics, automatics, and automation; screw-thread production; and gear production.

The book is well illustrated throughout.

### 103 Easy Jig Saw Projects — Full Size Patterns

By Floyd M. Mix. Paper, 80 pp., 8½ by 11 in., $1.50. Goodheart-Wilcox Co. Inc., Chicago, Ill.

(Continued on page 24A)


## HOW INDUSTRIAL ARTS TEACHERS CAN EARN EXTRA MONEY

ARE you interested in owning a small but profitable business as a side-line making hand-crafted products? Would you know what to make, where to sell it, how to get started? Perhaps you have seriously asked yourself these very same questions many times.

Of all the people in need of extra money, there are few who are as qualified as the shop teacher to design and create things that are "different," that won't compete with mass-produced articles.

You have the training, the skill, the interest. You have vacations averaging about three months a year. Perhaps you do not fully appreciate these advantages, but there they are, waiting to be organized and applied.

You will earn more than money, security and added confidence. You will be a better teacher because of your practical first-hand knowledge of merchandising methods. In dealing with the professional buyer, you will gain experience that can be learned only by direct contacts. Remember that buyers need products just as much as the seller needs customers. Companies spend millions of dollars each year sending their scouts to gift fairs, craft shows and out-of-the-way art and craft centers in search of the unusual in new products. If the quality of your design and craftsmanship is worth your asking price, and if you are able to supply the market, you will find the buyers . . . or they will find you.

What should you make? That depends, of course, on your special qualifications. One of our friends builds special boats for camps and resorts. Another creates high priced costume jewelry for a specialty shop, and he and his family are pressed for time to meet delivery schedules during the height of the season.

A Swedish teacher started his own school of design and crafts in a two-car garage. He had to give that up long ago to supply the demand for his wrought iron work. Let's hope, for your sake, that you won't be that successful. This teacher is now chained to an office desk, struggling with paper work instead of working in the shop.

This column, as many of you know, is usually devoted to the "Project of the Month" series. Today, we invite you to write for a helpful bulletin on the topic of making money in your own business. It is a free service to teachers. Please address your letter to: Teachers' Bulletin Service, Dept. D-50, The Castolite Company, Woodstock, Ill.

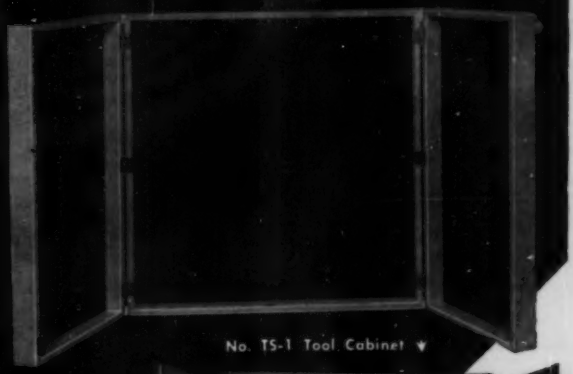
# Ample Storage Space is Economically Sound

**Every shop instructor can ease the burden of high enrollment and overcrowded classes by utilizing these efficient storage units**

No. L-2 Lumber Rack

No. 180 Safety Waste Can

No. TC-5 Tool Cabinet

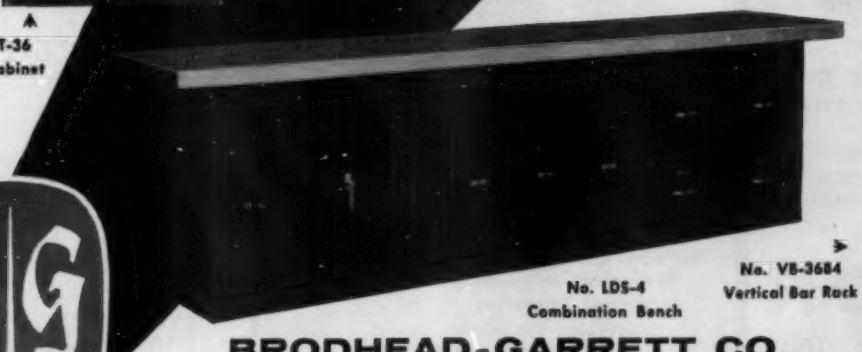


No. TS-1 Tool Cabinet

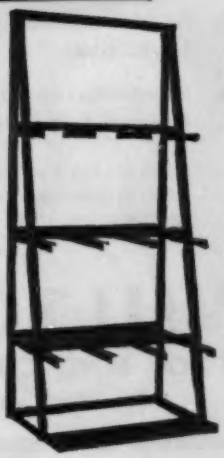
- Reduces chance for accidents
- Creates more useable space
- Allows for good shopkeeping
- Lends toward organized atmosphere
- Permits better inventory control

No. T-36 Tool Cabinet

All of these items are listed in the 1957 B-G Master Catalog.



No. LDS-4 Combination Bench



No. VB-3684 Vertical Bar Rack

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A logical way to measure vise values!

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★ 68% more strength
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WILTON
TOOL MFG. CO., INC.
Schiller Park, Illinois

## NEW PUBLICATIONS

(Continued from page 22A)

A fine selection of full-size patterns for jigsaw enthusiasts who want to saw out pleasing novelties, gifts, ornaments, and useful gadgets for the home, the yard, the lawn, or the garden. Also entertaining little cutouts to amuse the little ones.

### Electronic Computers — Principles and Applications

Edited by T. E. Ivall. Cloth, 167 pp., 5¾ by 8¾ in., illus., $10. Philosophical Library, Inc., New York, N. Y.

This book presents in a nonmathematical manner, an introduction to the principles and applications of valves and other electronic devices which will be of great use to students, technicians, and engineers.

It describes the evolution of the computer, explains the general principles of computing, presents analogue computer circuits, pictures the equipment and applications of analogue computers, and presents digital computer circuits for basic arithmetic operations, and for control and general organization. It also describes storage systems and the application of digital and future computers.

### Major Activities in the Atomic Energy Programs

Paper, 260 pp., 5¾ by 9⅛ in., $1.25. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

A report of the U. S. Atomic Energy Commission of the progress made during the first half of 1956 for devising fuel for power and research reactors and expanding the peaceful use of atomic energy.

The report covers the domestic and foreign production of raw material, and its military development and civilian applications.

The report also contains the regulations of the Atomic Energy Commission.

### Technological Advances and Skilled Manpower

Paper, 67 pp., 7⅞ by 10⅜ in., 45 cents. Superintendent of Documents, Government Printing Office, Washington 25, D. C.

This is an annotated selected bibliography which was prepared especially for trade and industrial educators, industrial training supervisors, and teacher educators.

The bibliography lists current items of nontechnical nature informing the reader of the points of view of representatives of management, labor, and education.

### Resonant Circuits

By Dr. Alex. Schure. Paper, 72 pp., 5½ by 8½ in., illus., $1.25. John F. Rider Publisher, Inc., New York, N. Y.

Volume 16 in the Electronic Technology Series, this book concerns itself with resistors, capacitors, and inductors which are found in various series, parallel or series parallel resonant combinations in electronic circuits. Analyses are made for the elements comprising parallel resonant circuits, then the circuits themselves. This is a clear, practical, easy to understand book for engineering students as well as for electronic technicians.

### National Leadership Development Conference in Trade and Industrial Education

Paper, 118 pp., 7¾ by 10⅜ in., illus., 60 cents. U. S. Department of Health, Education, and Welfare, Washington, D. C.

This conference is the outgrowth of the efforts of the Trade and Industrial Education section of the American Vocational Associa-

picked by professionals

Reach for a Venus drawing pencil and get the sharper, clearer line (in all 17 degrees of hardness) your work demands. Venus homogenized lead holds a needle point longer, insures uniform smoothness, perfect smudge-free work. Pressure proofing seals the lead to the wood along its full length so the Venus is stronger. Prove Venus superiority for yourself. *Send for the educational brochure "Atomic Energy and You" and get a FREE Venus Drawing Pencil.*

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tion, and its national planning and policy committee to promote and develop leadership within its field.

After much preliminary work the U. S. Office of Education called a meeting in Washington, D. C., and this report is what transpired at the meeting held August 1–12, 1955, at Fort Collins, Colo.

### Hand Woodworking

By DeWitt Hunt and John Bruce Tate. Cloth, 418 pp., 6 by 9⅛ in., illus. Harlow Publishing Corp., Oklahoma City, Okla.

This is the fourth edition of this book which has proved its value in high school and college preparatory classes.

Unit 1 shows how to design and plan a job. Unit 2 is on using hand tools. Unit 3 treats on how to sharpen hand tools. Unit 4 introduces the elementary machines — the lathe and the scroll saw. Unit 5 describes the joints and construction used in woodworking. Unit 6 is on assembling, and Unit 7 is on finishing the project. Unit 8 explains how to perform a number of carpentry jobs, and Unit 9 presents 36 projects that will find glad acceptance by the student and his parents.

### Machine Woodworking

By DeWitt Hunt and John L. Cermak. Cloth, 289 pp., 6 by 9⅛ in., illus. Harlow Publishing Corp., Oklahoma City, Okla.

This is a revised edition (revised by John L. Cermak) of this textbook which not only describes the circular saw, jointer, single cylinder surfacer, band and jig saw, shaper, boring machine, mortiser, drill press, sander, and woodworking lathe, but it also shows how to use all of these power tools safely, how to sharpen the knives and saws, and how to splice abrasive belts.

The book also contains 13 well-designed pieces of furniture.

The illustrations are good throughout the book.

### Engineering Structural Failures

By Rolt Hammond. Cloth, 224 pp., 6 by 9 in., illus., $12. Philosophical Library, Inc., New York, N. Y.

An interesting and instructive book on the study of what causes structural failure in the field of civil engineering.

The author has attempted to present both causes and results of failures in a number of accidents that have occurred over a century in earthworks, dams, harbor works, buildings, bridges, and tunnels. Also failures due to vibrations caused by earthquakes, vibration, and in welded structures.

The book contains nine chapters which treat the problems presented by earthworks, dams, maritime structures, buildings, bridges, underground structures, vibration, welded structures, and lessons of failures.

### 1957 Camp Reference and Buying Guide

Compiled by the editors of Camping Magazine, Galloway Publishing Co., 120 W. 7th Street, Plainfield, N. J., $2 per copy.

Those who expect to have anything to do with operating or working in a camp will find value in this new edition of the Camp Reference and Buying Guide. The book has more than 150 pages. All of them are crammed with a wide variety of factual answers to questions likely to come up in the course of a camping season.

The book is divided into sections on business management, food and food service, health and safety, maintenance and development, and program. Each section is further subdivided to cover a wide range of activities.

The Program section contains information on more than 200 different craft projects,

(Continued on following page)

all-new shop and mechanical drawing equipment by Hamilton

These are just four of the many units in Hamilton's new line of Arts and Crafts Equipment. The work benches, drafting tables, and wealth of storage cases and cabinets to be found here offer a fine range of equipment for almost any shop or mechanical drawing classroom. You'll find it's the most complete and highly functional line available. And it's described in Hamilton's new Arts and Crafts Catalog 219. Write for your free copy now!

Hamilton

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## NEW PUBLICATIONS

(Continued from previous page)

graded by age of camper and with list of materials required. Also covered under program are photography, boat mooring methods, equipment for camp water fronts, dock layouts, pool maintenance methods, dimensions and diagrams of fields and courts for most popular camp sports, check list of sports supplies, riflery pointers, graded tests of camping skills, equipment for out-of-camp trips, camp movies, etc. Other sections are similarly comprehensively covered.

Included also is a bibliography of over 300 books in the field of camping; a section on the American Camping Association, of which the Camp Reference and Buying Guide is an official publication; and the Buying Guide which lists hundreds of sources from which can be obtained nearly every product needed in the operation of a camp.

### Planning and Conducting a Program of Instruction in Vocational Agriculture for Young Farmers

By H. N. Hunsicker, program specialist in agricultural education. May be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at 45 cents a copy.

This publication covers plans for systematic programs of instruction conducted by local boards of education. Eligible are young out-of-school farmers. The classes described in the booklet help prevent unwise decisions by young farmers while getting established. The program tackles such topics as how to divide farm income between family living needs and expansion of farm business, how much credit is necessary and how rapidly to pay off debts, and how to increase farm production. This type of vocational education also includes individual on-the-farm instruction for some class members.

### Vocational and Professional Monographs

The Bellman Publishing Co., Cambridge, Mass.

The number of pages per monograph varies. All of them are 6 by 9 in., and cost $1 each.

Each of these monographs is brief but to the point. Each covers a given trade or occupation and presents the personal qualities required by the worker, the scholastic training required, the employment opportunities, probable remuneration received, chances of advancement, and possibilities for men and women in the field.

Some of those that have appeared are on adult education, metallurgy, modeling, personnel administration, the tool and die industry, soap and detergent industry, life insurance, the American motor transport industry, the jewelry industry, numismatics, the dairy industry, stock brokers, the pen industry, the linotype operator, astronomy, meat packing industry, American railway industry, fashion design, dentistry, and the library profession.

### Materials and Processes in Manufacturing

By E. Paul DeGarmo. Cloth, 755 pp., 6⅜ by 9½ in., illus., $8.50. The Macmillan Company, New York, N. Y.

A text for engineering students which aims to give them a thorough understanding of the materials and processes used in the manufacturing industry.

In the section on materials, the nature and property of materials are discussed and the production of common engineering metals are explained, as are also heat treatment, alloy steels and irons, nonferrous alloys and plastics.

(Continued on page 28A)

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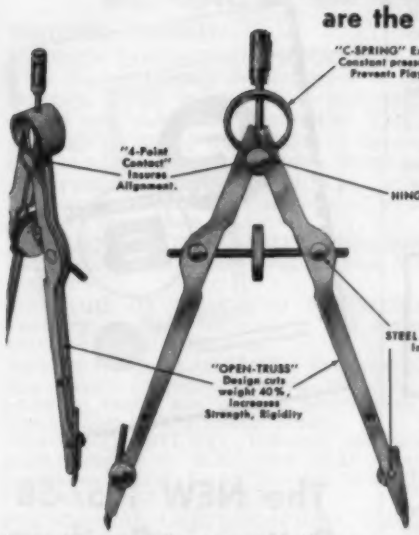
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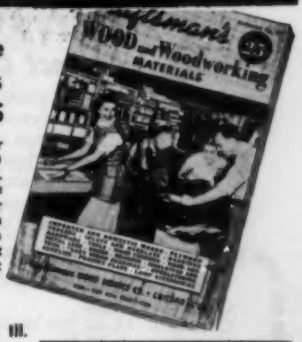


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## NEW PUBLICATIONS

(Continued from page 26A)

Part 2 treats of casting and forming processes. Casting, sand, permanent mold, die, centrifugal, precision investment, and shell. Also powder metallurgy, hot-working processes, and cold-working processes.

Part 3 explains measuring and gauging, metal cutting, shaping and planing, drilling and reaming, turning, boring, milling, sawing and filing, broaching, grinding, screw thread cutting and gear cutting.

Parts 4 and 5 cover welding and allied processes, and techniques related to manufacturing.

## *Business and Personal News*

### NEW BOARD MEMBERS ELECTED

At a meeting of the Board of Directors of Nicholson File Company, held on January 31, 1957, the following new members were elected to the Board: Edmond A. Neal, vice-president, domestic sales; Charles E. Fogg, vice-president and secretary; and John E. Holt, president of The Danielson Manufacturing Company, a subsidiary of Nicholson File Company.

### GENERAL MANAGER NAMED

James A. Wold has been named general manager for the newly created Consumer Products Department of the Borden Company's Chemical Division. He will be in charge of new product development and promotion of the existing line of consumer products.

Consumer products manufactured and marketed by Borden's Chemical Division include Elmer's Glue-All, a general-purpose polyvinyl acetate adhesive; Elmer's Non-Flammable Contact Cement; Elmer's Contact Cement; solvents for the cements; Borden's 38, a nitrogen fertilizer, and Casco Casein Glue.

Mr. Wold joined Borden's at Seattle in 1954 as an administrative assistant for West Coast chemical operations. His new headquarters will be in New York City.

### STARRETT PERSONNEL CHANGES

The L. S. Starrett Company announces the retirement of J. E. Hindes, sales representative in the Pittsburgh, Pa., area after fifty years of service with the company.

W. E. Clark, Jr., previously covering western New York, succeeds Mr. Hindes in the Pittsburgh area.

J. R. Boehm, formerly of the Los Angeles area, has been appointed sales representative in western New England, succeeding C. A. Bassett, recently appointed general sales manager.

R. S. Lougee has also been made sales representative in western New England assisting Mr. Boehm.

### DeWALT, INC., APPOINTMENTS

Edward W. Forth, formerly vice-president in charge of manufacturing for DeWalt Inc., a subsidiary of American Machine & Foundry Company, and a manufacturer of power tools

(Continued on page 30A)


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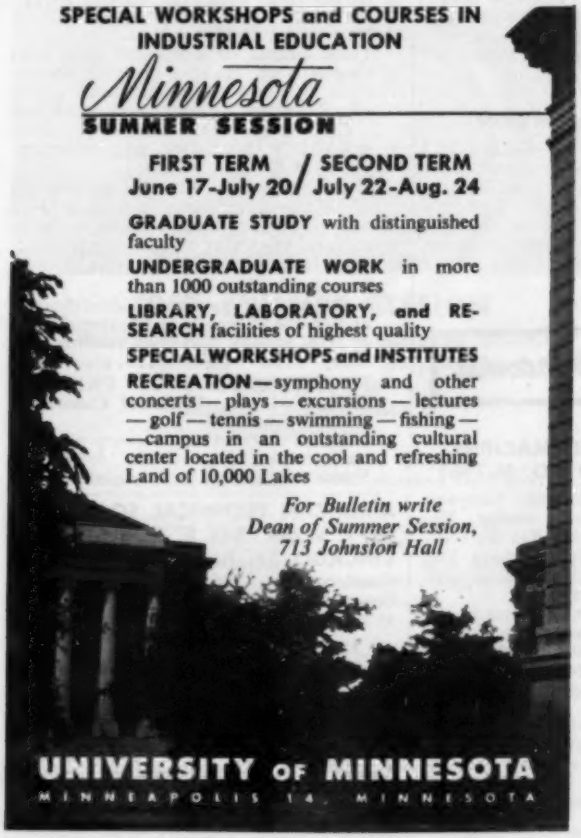

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## BUSINESS AND PERSONAL

(Continued from page 28A)

for home and industry, has been named vice-president and general manager of the AMF Cycle Company in Little Rock, Ark., it was announced recently by Robert W. Kerr, AMF vice-president and group executive.

Mr. Forth joined AMF in 1948 as assistant to the works manager of the Buffalo plant. In 1952 he was made quality control manager there, before joining DeWalt Inc. as assistant plant superintendent in 1953. At DeWalt he was appointed general superintendent in February, 1955, and vice-president in charge of manufacturing in October of that year.

Concurrent with Mr. Forth's transfer to the Cycle Company, Albert C. Wedge, formerly production superintendent for DeWalt, has been named director of manufacturing by Condé Hamlin, president.

Mr. Wedge joined DeWalt in February, 1956, as production superintendent, in which capacity he had served under Mr. Forth until the present time.

Prior to his affiliation with DeWalt he served in industry as a consultant in the manufacturing field, and as a production engineer and chief industrial engineer. He is a native of Minneapolis, Minn., and a graduate of the University of Minnesota.

James Denmark has been named St. Louis district sales manager for DeWalt Inc., it was announced by Condé Hamlin. From his headquarters in St. Louis, Mr. Denmark will direct the company's sales activities in the state of Missouri, southern Illinois, and portions of Western Tennessee and Kentucky.

Mr. Denmark joined DeWalt in March, 1954, as a demonstrator-salesman in which capacity he served as an assistant to the firm's district managers in all types of special dealer promotions. In March, 1956, he entered his present territory on a temporary basis, following the illness of the previous manager of this area.

### PLEASE NOTE CORRECTION

Portable Electric Tools, Inc., Chicago, Ill., have advised us that the news of their representation in the states of Tennessee, Georgia, Alabama, and Florida, as published in the March, 1957, issue, is in error, and that the Reid H. Cox Company is no longer associated with them.

## *Descriptive Material*

### CINCINNATI MILLING MACHINE COMPANY CATALOG NO. M-1961

The Cincinnati Milling Machine Company announces their new general catalog, No. M-1961, which completely describes the company's various lines of current products. The catalog has been written and constructed with the machine tool buyer in mind.

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(Continued on page 32A)


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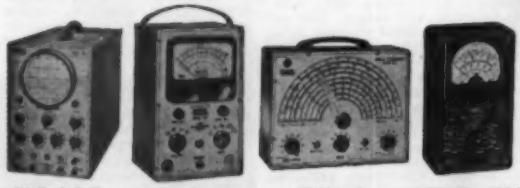

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## DESCRIPTIVE MATERIAL

(Continued from page 30A)

### BORDEN COMPANY'S DESCRIPTIVE FOLDER

To introduce its expanded line of Placco plant maintenance materials, the Coatings and Adhesives Department of the Borden Company's Chemical Division is offering a descriptive folder to plant engineers and maintenance men.

Placco products cover a wide range of industrial maintenance problems. Among those described in the folder are auto and truck undercoatings; asphalt pavement sealers; roofing compounds for new or old construction; flooring underlayments, resurfacers and levelers; insulation coatings and adhesives; flooring tile cements for above, on or below grade; and waterproofing compounds.

For detailed application information and price scales write to the company.

**(For Convenience Circle Index Code 0414)**

### BULLETIN ON FINGER JOINTING

The Wisconsin Knife Works have made available their new bulletin on finger jointing. Bulletin No. 700 contains information and recommendations on the type of machine that should be used for finger jointing; examples of typical wood parts that are being successfully finger jointed; specifications of standard heads; dimensioned drawings of standard joints; and how easy it is to use and maintain.

Copies of Bulletin No. 700 may be obtained by writing to the company.

**(For Convenience Circle Index Code 0415)**

### 1957 CATALOG OF WOOD AND WOODWORKING MATERIALS

Craftsman Wood Service Company have made available their new catalog. It contains 132 pages illustrated with clear detailed pictures and drawings, presenting a complete and accurate woodworking buyers' guide to help in the selection of woods, inlays, plywood panels, attractive turnings, knobs, pulls, and moldings.

This catalog includes a brand new complete line of upholstering materials and tools, a full selection of modern turned wood legs in all sizes, modern metal legs, lazy Susan bearing units, music box movements, and many other items. There is also an enlarged woodworking tools section.

Copies are available by writing to the company and enclosing 25 cents to cover part of the cost.

**(For Convenience Circle Index Code 0416)**

### LINDE MOTION PICTURES

Linde Air Products Company, a division of Union Carbide and Carbon Corporation, have made available a series of 16mm. motion picture films, on the subject of welding, for making teaching easier, and learning more complete. Each film shows in natural color, how to do one basic process. Each film proves to students that the teacher's explanations are practical and the demonstrations within their reach. Each of the six films drives home to students the lessons to be learned before they can weld or cut satisfactorily. They help to bridge the gap between the explanation of how to weld and cut, and practice sessions when the student demonstrates what he has learned. As such, they are a logical prerequisite to shop practice. These training aids are based on more than a century of oxyacetylene experience.

Further information is available upon request.

**(For Convenience Circle Index Code 0417)**

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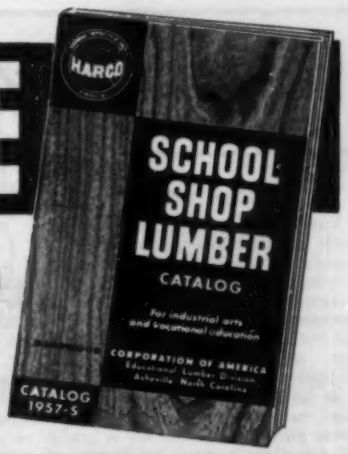


# *New* 1957

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# SMALL BOAT LOFTING

*By Claude W. Horst*

The fundamentals of boat lines drawings, boat lofting, and lay-out are presented in a simple manner . . . an excellent guide for the shop instructor who is interested in teaching his students how to loft or lay out any set of properly developed boat lines drawings.

THE BRUCE PUBLISHING CO.
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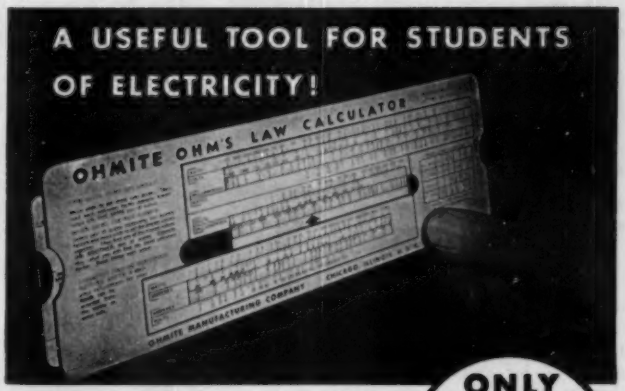


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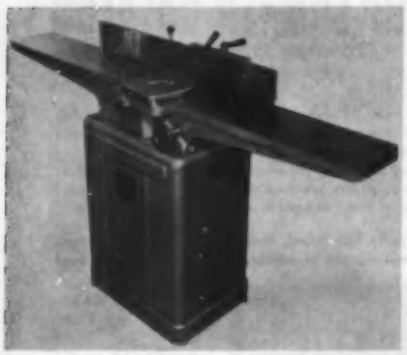
OHMITE MANUFACTURING CO. 3656 Howard St., Skokie, Ill. (Suburb of Chicago)

# Shop Equipment News

## NEW JOINTERS INTRODUCED

Yates-American Machine Company have made available two additions to their J-line woodworking machines — the J-136 and J-138 — 6-in. and 8-in. jointers. The new machines feature a jointer fence adjustment to permit movement of stock at a 10-deg. angle across the cutterhead. They are of streamlined design, with safety an important factor. In addition to conventional swing-type guards, a de luxe safety guard is offered which allows stock to pass beneath the guard, giving maximum protection.



New 8-in. Jointer, the J-138. Both of the new jointers are equipped with shear-cutting fence

The new machines, available with or without cabinet, can be powered by any NEMA or odd frame motors — with capacities of from ⅓ to ¾ h.p., 1- or 3-phase for the 6-in. jointer; ¾ to 1½ h.p., 1- or 3-phase, for the 8-in. jointer.

With the addition of the new J-136 and J-138, the Yates-American J-line is expanded to ten machines which include a 10-in. circular saw, 20-in. band saw, 12-in. lathe, 18 by 6-in. surfacer, 16-in. combination belt and disk sander, spindle sander, shaper, and mortiser.

For further information on other important details of the two new jointers, write to the company.

**(For Convenience Circle Index Code 0401)**

## OIL PRESSURE GAUGE AND ADAPTORS

Snap-On Tools Corporation have released for national distribution a new oil pressure gauge set for automatic transmissions. With this set any mechanic can quickly check oil pressure on virtually all automatic transmissions in use today.

The large 3½-in. dial on the face of the gauge is clearly calibrated from 0 to 300 lb. per square inch and the attached six-foot hose is equipped with a quick coupler for fast, easy interchange of threaded adaptors. Of the ten adaptors furnished, three are made with ends to fit the quick coupler, the balance have various size threads to fit the connections of the different transmissions and are used in conjunction with the three mentioned above.

Ample room is provided in the specially designed partitioned metal box included with

Oil Pressure Gauge and Adaptors

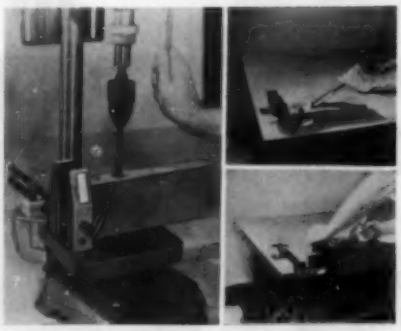
the set, with separate compartments for the adaptors and gauge assembly for greater convenience and protection. A chart located in the lid of the box shows the various combinations of adaptors used for different transmissions.

Further information is available by writing the manufacturer.

**(For Convenience Circle Index Code 0402)**

## NEW MULTI-USE HOLDING DEVICE

DeWalt Inc., a subsidiary of American Machine & Foundry Company, and manufacturers of industrial and homeshop equipment, have introduced a new Multi-Use Holding Device, known as the "Giant Grip."



Multi-Use Device, the "Giant Grip"

The unusual flexibility of the Giant Grip permits its use as a bench vise, a drill press or power saw fixture, a large capacity wrench, a work clamp, and for other similar applications. It can be considered applicable for use in homeshops, commercial crafts establishments, and private or commercial garages and automotive shops.

The versatility of the new holding tool is designed to eliminate the need for many single-purpose gripping devices. With the Giant Grip, a change-over of functions is accomplished in a matter of seconds, simply by releasing the pressure of a single lock and removing the functional portions of the tool from the bench clamp.

**(For Convenience Circle Index Code 0403)**

## "STACOR-MATIC" TABLE

The Stacor Equipment Company has introduced an ingeniously designed combination drafting-reference unit which makes more flexible, productive use of existing floor space. In use, a row of these "Stacor-Matic" tables serves the men in front as reference facilities and the men behind as drawing tables, so that each has his own compact "office," and it is not necessary for him to leave his

"Starcor-matic" Table

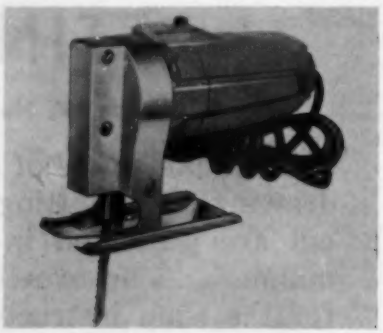
seat for reference. The drawing table has easy wide-range height and slope adjustments, and the reference section is equipped with generous drawer and file space. All "Stacor-Matic" units have modern island bases with floor-leveling devices. Drawers are all steel and operate smoothly on ball bearings. Reference surface is heavily reinforced steel covered with desk-top linoleum, and footrest is surfaced with a skidproof rubber mat. Finish is attractive dark gray hammertone.

Catalogs and prices available from Stacor Equipment Company.

**(For Convenience Circle Index Code 0404)**

## MODEL 2050 JIG SAW

Portable Electric Tools, Inc., have introduced their new Model 2050 Jig Saw, which cuts any shape whether curves, angles, circular cuts or scroll work. It comes with three types of blades that handle cutting into wood, plastics, metals, composition, hard rubber, or leather. The unit will make its own starting hole, and it has a new method of counter balancing reciprocating parts thus eliminating



Model 2050 Jig Saw

vibration. The cool running motor enables the operator to comfortably handle this saw without the use of auxiliary handles. The 2050 has a conveniently located slide-type switch, long base for proper support, and an air jet from the motor fan blows the sawdust away from the guide line while operating. Finished in a two-tone blue and gray hammerloid and weighs only 3½ lb. The motor is a Universal a.c., 115-volt unit rated at 1.8 amperes. No-load speed of 2650 strokes

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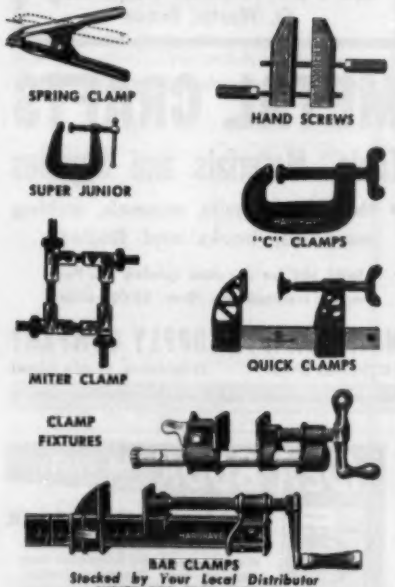


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per minute. Easily cuts 2 by 4 in seconds.

Further information available from the manufacturer.

**(For Convenience Circle Index Code 0405)**

## SELF-READING TAPE RULE

Frederick Post Company announces the availability of a unique extension tape rule that permits instantaneous readings right from a dial. Called Reado-matic, the self-reading rule shows complete measurements to fractions of an inch, clearly read on a vernier dial, with a remarkable degree of accuracy. Upper graduations on dial show 1/16-in. fractions with main fractions on lower side.

Self-Reading Tape Rule

The triple coated white-face tape is counterbalanced with an inner return spring for smooth operation. Oiling and cleaning pads are built in to clean and oil the blade each time it is used.

A small serrated steel wheel scriber is self-contained in the case for marking measurements. Movable end-clip on tape compensates for "butt" or "hook" measurements. Reado-matic Tapes are furnished in a die cast, highly polished chromeplated case.

**(For Convenience Circle Index Code 0406)**

## AMMCO MODEL 3000 "SAFE-TURN" BRAKE DRUM LATHE

Model 3000 "Safe-Turn" Brake Drum Lathe, manufactured by Ammco Tools, Inc., will handle all passenger car and light truck and some medium truck drums with standard equipment. Heavy-duty accessories are available as required.

Ammco Model 3000 Safe-Turn Brake Drum Lathe

The "Safe-Turn" has many exclusive features including hexagonal Boring Bar, Protective Boots covering critical parts, and a Feed Mechanism with range from .002 in., to .020 in. It is extremely rugged and accurate yet is very simple in operation.

(Continued on next page)


**THE *Hotpack* ELECTRIC PLASTIHEETER**

No. 15

Designed for Use in Plastic Courses in the School — a commercial type strip heater designed to heat sheets of Plexiglass or Lucite until they become soft and pliable for shaping to the form desired. It is essentially used for straight line bends or folds and is capable of heating sheet material up to ⅛" thickness in from 30 seconds to 4 minutes depending on the thickness of the contact with the heating element and the platen remains cool, there is no possibility of creating mark-off on the sheet.

SPECIFICATIONS

| No. | Working Space | Overall Size |
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| 15 | 18"Lx5"Wx2½"H | 21"Lx7"Wx3½"H |
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| No. | Wattage 115 Volt | Shipping Weight | F.O.B. Phila. |
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| 15 | 200 W | 4 lbs. | $22.50 |
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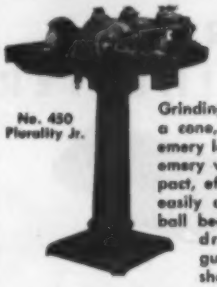

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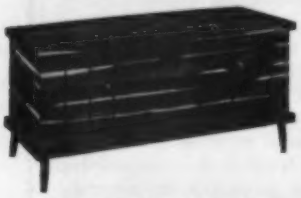

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## SHOP EQUIPMENT NEWS

(Continued from previous page)

Both pieces of equipment are basic and absolutely necessary for good and effective brake service.

**(For Convenience Circle Index Code 0407)**

### HIGGINS ENLARGES DRAWING INK LINE

Higgins Ink Co., Inc., have added two new waterproof black drawing inks to the Higgins Line, and their Soluble Black India Ink has been reformularized and is now called Non-Waterproof Black. Higgins American Waterproof India Ink remains unchanged.

Higgins Drawing Inks

One item known as Higgins Acetate Ink is a Waterproof India Ink for use on the dull or prepared side of acetate sheets and other nonabsorbent surfaces. Acetate ink is also intended for use on water repellent tracing cloths and sensitized and developed papers and cloths. This ink works with all drafting and art instruments on the newer surfaces and preserves well, thus filling a great need.

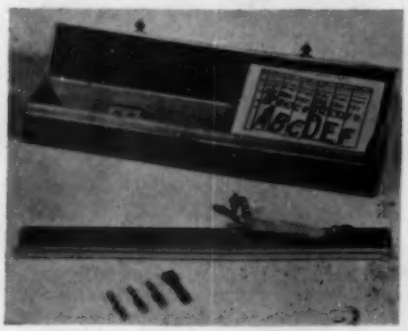
The second new product is Super Black Waterproof Drawing Ink designed for art uses with a brush and pen. Super Black is a high intensity black which will be welcomed by cartoonists, illustrators, and others called on to complete drawings on high surface bristol board. It is especially suitable for brush work.

The reformularized Soluble Black may be applied to plastic sheeting and water-repellent surfaces. It may be removed, however, from nonabsorbent surfaces with cold water, whereas the Acetate Ink is waterproof when dry. Non-Waterproof Black still retains its previous qualities which endeared it for use on paper for fine line work and washes.

**(For Convenience Circle Index Code 0408)**

### TECH-GRAPH LETTERING SET

A practical, inexpensive lettering aid aptly named Tech-Graph is available through Alvin & Company. It features a specially designed 15-in. nonslipping guide holder. Included are a fully adjustable scriber and Template Scriber




Tech-Graph Lettering Set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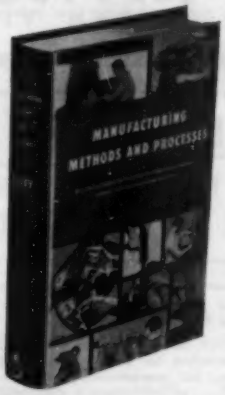


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Guide in both capitals and lower case alphabet and numerals in the five most frequently used sizes — 1/8 in., 3/32 in., 5/16 in., on one side, and 1/4 in., and 5/32 in., on the opposite side. Attractively boxed with the above are three nickeled reservoir ink retainers, with quick cleaning inking points for heavy, medium, and fine lettering; interchangeable lead holder for standard refill drawing leads; extra refill leads and "Finger-Tip" Lead Pointer, all included.

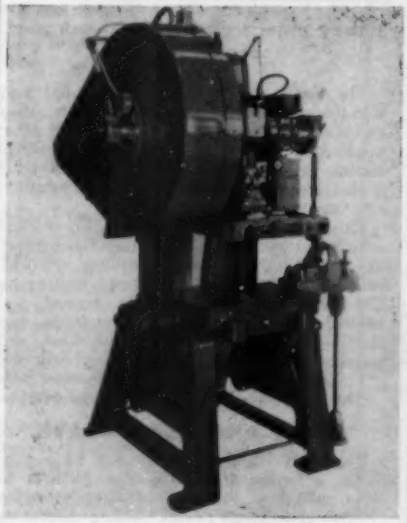
This popular and versatile lettering instrument adjusts to more than 100 positions and is especially designed for lettering on maps, drawings, charts, advertising layouts, small signs, movie titles, price tickets, stamp albums, Multilith Masters and Mimeograph Stencils.

For more information on its easy, quick, and automatic operation, write to Alvin & Company.

**(For Convenience Circle Index Code 0409)**

### LEFT-HAND FLYWHEEL MOUNTING

The Press-Rite Press Division of Sales Service Machine Tool Company have announced that Press-Rite Presses are now available with either right or left-hand flywheel mounting.



Left-Hand Flywheel Mounting

Standard right-hand flywheels are often inconvenient for those who have dies arranged for right to left manual feeding and wish to change to automatic feeding, the flywheel cuts down on the space for working on the automatic feed. Obtaining the power for the feed is often quite costly and intricate. By having presses which have left-hand flywheel mounting, the present dies can be used, the open shaft provides handy power for the feed and at much lower cost.

By having left-hand flywheel mountings, plant layouts in the press room can, at times, be improved greatly. There is more flexibility in arranging for both manual and automatic feed operations. Often a great deal of floor space is saved.

Press-Rite engineers state the left-hand flywheel mounting is presently available on all air clutch models 10 ton and larger.

Additional information on these presses will be furnished by Press-Rite Division, Sales Service Machine Tool Company.

**(For Convenience Circle Index Code 0410)**

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(Continued on next page)


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## SHOP EQUIPMENT NEWS

(Continued from previous page)

materials. An extruded acrylic sheet, it is suitable for many home shop and crafts applications. Immediate delivery in any quantity from one sheet up is offered on the new low-cost sheet in clear and white translucent colors.

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Further information is available.

**(For Convenience Circle Index Code 0411)**

### "PEOPLE AND GOODS TRAVEL"

The Jam Handy Organization have produced a series of on-the-scene pictures in color, all done in live photography, called "People and Goods Travel." It is a classroom-tested series produced and documented for use in primary grades. The individual filmstrips are titled: Airplanes, The Passenger Train, The Freight Train, Buses, Trucks, and Boats and Ships. Suggested curriculum areas are Social Studies and Language Arts.

A scene from "Airplanes"

Children are shown taking actual trips and seeing how goods are carried.

The new series is available from The Jam Handy Organization, and from all authorized Jam Handy dealers.

**(For Convenience Circle Index Code 0412)**

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| Code No. | | Page No. |
|---|---|---|
| 40 | **Adjustable Clamp Company**..... Jorgensen and Pony clamps. | 8A |
| 41 | **Allied Radio Corp., The**..... Sound systems for your school. Use coupon page 30A for catalog. | 30A |
| 42 | **American Gas Furnace Co**..... Heat treating equipment. | 38A |
| 43 | **American Technical Society**..... Publishers. For on approval copies use coupon page 30A. | 30A |
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| 45 | **Atlas Press Company, The**..... Lathes. School shop planning guide —50¢ | 9A |
| 46 | **Bedford Lumber Co**..... Knockdown cedar chest & aromatic red cedar lumber. | 36A |
| 47 | **Black and Decker Mfg. Co**..... Two new tools to improve sheet metal training. | 5A |
| 48 | **Board of Examiners**..... Teaching positions. | 38A |
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April, 1957

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| 40 | 46 | 412 | 418 | 424 | 430 | 436 | 441 | 446 | 451 | 456 | 461 | 466 | 471 | 476 | 481 | |
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| 44 | 410 | 416 | 422 | 428 | 434 | 440 | 445 | 450 | 455 | 460 | 465 | 470 | 475 | 480 | 485 | |
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| 40 | 46 | 412 | 418 | 424 | 430 | 436 | 441 | 446 | 451 | 456 | 461 | 466 | 471 | 476 | 481 | |
| 41 | 47 | 413 | 419 | 425 | 431 | 437 | 442 | 447 | 452 | 457 | 462 | 467 | 472 | 477 | 482 | |
| 42 | 48 | 414 | 420 | 426 | 432 | 438 | 443 | 448 | 453 | 458 | 463 | 468 | 473 | 478 | 483 | |
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| 44 | 410 | 416 | 422 | 428 | 434 | 440 | 445 | 450 | 455 | 460 | 465 | 470 | 475 | 480 | 485 | |
| 45 | 411 | 417 | 423 | 429 | 435 | | | | | | | | | | | |

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**(Continued)**

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| 0407 | **Ammco Tools, Inc.**..... Model 3000 "Safe-Turn" Brake Drum Lathe | 35A |
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| 0410 | **Sales Service Machine Tool Co.**... Left-Hand Flywheel Mounting | 37A |
| 0411 | **Cadillac Plastic and Chemical Co.**.. Low-Cost Acrylic Sheet | 37A |
| 0412 | **Jam Handy Organization**..... Picture Series — "People and Goods Travel" | 38A |
| 0413 | **Cincinnati Milling Machine Co.**..... Catalog No. M-1961 | 30A |
| 0414 | **Borden Co.** ..... Descriptive Folder | 32A |
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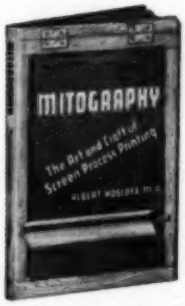


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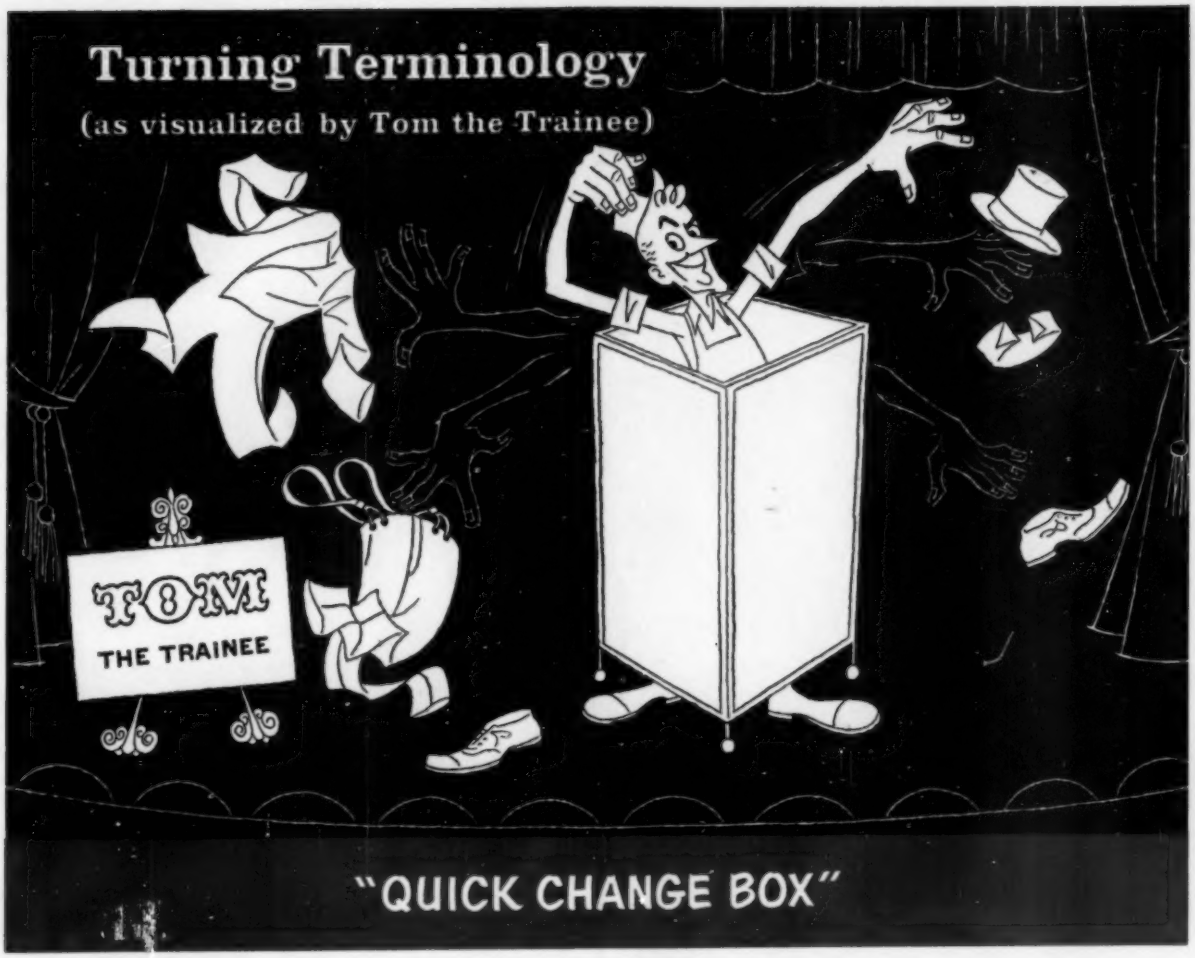


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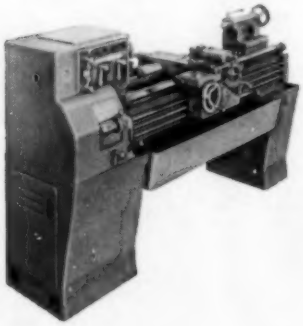

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